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OUTLINES

OF

MEDICAL JURISPRUDENCE

FOR

INDIA.

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MEDICAL JURISPRUDENCE

FOR

INDIA.

BY

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MADRAS CIVIL SERVICE (RETIRED),

AND

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TO

Surgeon Lieutenant-Colonel E. LAWRIE, M.B.,

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of

His Highness the Nizam's Dominions,

IN TOKEN OF

HIS DISTINGUISHED SERVICES

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AND

CHLOROFORM ANÆSTHESIA

THROUGHOUT THE WORLD,

BY

THE AUTHORS.

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PREFACE.

Since the publication of the last two Editions of the "Outlines of Medical Jurisprudence for Indian Criminal Courts," the Authors have taken advantage of the many valuable criticisms that have appeared in the columns of the various public prints, both in Europe and in India, and likewise of the personal observations and suggestions that have emanated from their legal and medical friends. As a result, the text has been revised, the technical details annotated for the purpose of rendering the subject thoroughly intelligible to the lay reader, whilst the matter has been enlarged to extend its sphere of usefulness. With these objects in view the book is now produced under the more comprehensive title of "Outlines of Medical Jurisprudence for India," and it has been divided into five Sections, namely,—

I.—Method of investigating Medico-Legal cases in India.

II.—Deaths from Violence—Suicidal and Homicidal.

III.—Offences against Chastity, Infanticide and Fœticide.

IV.—Life Assurance and Insanity.

V.—Poisons.

It may be noticed that these sections, which, for practical purposes, form natural divisions of the subject, have been subdivided into Chapters, which have again, for purposes of reference, been paragraphed. In thus paragraphing the book, two objects have been attained—(1) that of specifying the matter contained in each paragraph in marginal headings; and (2) the incorporation of the marginal headings in a copious index—this latter

being, in the opinion of the Authors, one of the most valuable of the improvements to which the book, in its present form, may lay claim.

Generally, much that was obsolete and supererogatory in previous editions, has been expunged and new matter substituted. The additions are comprised in the Chapters on "Medico-Legal Evidence in India," "Wounds and Injuries," "Rupture of Internal Organs," "Hanging and Strangulation," "Rape, Infanticide and Fœticide"; whilst the Chapters on "Poisons" have been elaborated and a medico-legal account of several important poisons added. A Chapter on "Snake-Poisons" and "Snake-Bites" which had been inadvertently omitted from former Editions has also been incorporated.

It may be thus noticed that the Authors have endeavoured to deal with Indian medico-legal matters essentially from a practical standpoint, although, where absolutely necessary to the elucidation of the text, the scientific aspect has not been neglected; and Mr. GRIBBLE desires to add that as the entire revision, annotation and extension of the scope of the book has been carried out by his co-author SURGEON-CAPTAIN PATRICK HEHIR, the matter needs, perhaps, no further authenticity.

It has been our intention to adapt the book to the requirements of not only the Subordinate grades of the Medical Service, but likewise to Police Officers, Subordinates of the Judicial Service, and Pleaders. It has, however, been difficult to properly adjust the scope of the work, and if, in our conception of its needs, it has thus been rendered more voluminous, we hope that it has at the same time been made more complete, and that the changes effected will in no way militate against its usefulness for those classes for whom it is specially prescribed. In short, the book is intended to provide the non-medical man in an intelligible form with such matter

as is contained in the more comprehensive and technical works on Indian Medical Jurisprudence, such as those of CHEVERS and LYONS—free from all that might otherwise be complex.

We have to express our thanks to the many authorities of whose Works and Reports we have freely availed ourselves. We desire specially to acknowledge the help we have received from CHEVER'S *Medical Jurisprudence in India;* TAYLOR'S *Principles and Practice of Medical Jurisprudence ;* LYON'S *Medical Jurisprudence for India;* MACKENZIE'S *Medico-Legal Experiences in Calcutta;* HUSBAND'S *Forensic Medicine and Medical Police ;* TIDY'S *Legal Medicine ;* GUY AND FERRIER'S *Forensic Medicine ;* BLYTH'S *Poisons;* STEWART'S *Trials for Murder by Poison ;* SIR JOSEPH FAYRER'S *Thanatophidia of India;* VINCENT RICHARD'S *Landmarks of Snake-Poison Literature ;* WALL'S *Poisonous Snakes of India ;* and from several contributors to the various volumes of the *Indian Annals of Medical Science,* especially HARVEY, KENNETH MCLEOD, R. F. HUTCHINSON, CULLEN, and others. All special abstracts, quotations, and remarks have, we think, been acknowledged in the body of the book. Should we have unwittingly withheld the name of any writer of whose work we have made use, we would here express our regret for such omission. So much, however, in Medical Jurisprudence and its allied subjects has become common property, that it is often difficult, if not impossible, to assign to the rightful Author his share in particular references.

We take the opportunity of stating that by Resolution No. 207, dated 9th June, 1890, this book has been adopted by the Government of Madras as the text-book on Medical Jurisprudence, and also by His Highness the Nizam's Government in the examination for Police Officers, Pleaders, and others; and having regard to the fact that, perhaps, a large number of readers embraced in these classes are more thoroughly familiar with Urdu than with English, an Urdu translation of the "OUTLINES" will be published on the

15th May of the current year. The work of transcription was undertaken by that distinguished linguist, Syed Ali Belgrami, Shams-ul-Ulama, B.A., LL.B., etc., whose reputation as an authority on Oriental Literature is sufficient guarantee of the genuineness of the translation.

The Authors earnestly trust that this Edition has before it the same career of usefulness and popularity that attended the former editions; for it has been specially gratifying to them to feel that the Public appreciation of their work became so self-evident in the fact that the Second Edition was exhausted within a few months of the date of its publication, and which has been practically out of print for the past six months.

Hyderabad, Deccan,
15*th April*, 1892.

J. D. B. G.
P. H.

CONTENTS.

SECTION I.

CHAPTER I.

INTRODUCTION.

PAGE.

Preliminary remarks—Scope and object of this book—Necessity of some knowledge of medical jurisprudence—Necessity for careful observation—Marks found on dead bodies—Medical reports, what they should contain—Only facts should be recorded, without any expression of opinion on the facts—Caution to be exercised before expressing an opinion—Evidence in regard to scars—Examination of external wounds—Wounds caused before or after death—*Post-mortem* examination of decomposed body—Whether body warm or cold when found—Points to be noted when a body is found—The inquest—Police notes . . . 1–14

CHAPTER II.

ON EVIDENCE IN INDIA.

False and concocted evidence—Instances of peculiarities of native evidence—Mahomedan law in regard to evidence by proxy—False evidence in a true case—False evidence through fear—False evidence the result of ignorance—Remarks on the evidence of the uneducated class of Natives—False confessions are not uncommon—Zeal of police sometimes carried too far—Concluding remarks 15–22

CHAPTER III.

MODES OF DEATH.

Syncope—Asphyxia—Coma—Tabular view of modes of death—Coma, death beginning at the head—Syncope, death beginning at the heart—Apnœa (asphyxia), death beginning at the lungs—Causes of sudden death—Presumption of death—Presumption of survi-

PAGE.
vorship—Definite rules exist in some countries in regard to survivorship—English law presumes nothing—Exceptional rules in regard to survivorship 22–28

CHAPTER IV.

WOUNDS AND INJURIES.

What are wounds—Cause of death—The inquest—Identification of the body—General details to be observed in regard to identity—Special appearances to be noted in case of mutilated remains—Notes in regard to a skeleton or indivdual bones—Clothes or ornaments may aid in establishing identity—Remarkable cases of identification—Subsequent evidence regarding wounds—Evidence as to whether wounds caused before or after death—Wounds caused after death—Distinguishing features of wounds inflicted before and after death—Suspicion thrown on enemies of deceased's family in cases of natural death—Retracted vessels safest sign of wounds caused during life-time—The *post-mortem* examination—Size and description of wounds to be noted—Has the wound been inflicted before or after death?—Bruises or contused wounds—Difference between a blow caused before and after death—Rule not to be taken as a hard and fast one—Certainty of the rule as regards a blow given after *rigor mortis* has set in—Appearance of wounds inflicted during life—Appearance of wounds inflicted after death—Case of judicial murder of innocent man—Position and course of wound to be described—Rules adopted in Europe regarding period of death not applicable to India—Death where there is no internal or external mark of injury—Death from shock—Death from squeezing of testicles—Death of wounded persons from natural causes mistaken for violence—Death after long periods—By what kind of weapon was the wound caused—Difficulties in regard to fractures greater than in the case of wounds—The rice-pounder a common weapon of assault in the Madras Presidency—Presumption of intention from the weapon and violence used—The Bamboo or *lathi* commonly used in Bengal—Causing death in self-defence . . 29–48

CHAPTER V.

ON RESPONSIBILITY FOR DEATH.

What is a mortal wound—Difference between the law in India and England—What is sufficient to constitute murder—Recorded

PAGE.

cases of death from slight injuries—Responsibility of aggressor for consequences of an injury—Death arising from unskilful treatment of wound—Cases quoted of unskilful treatment—Cases in which death results from neglect of slight wound—Failure of injured person to call in medical aid does not exonerate accused—Effects of an unauthorised assault—Wound or hurt which hastens death in a person already diseased—Secondary causes of death—Patient dies from suffocation in case of cut throat—Difficulty in deciding responsibility of person when death due indirectly to injury caused by him—Difference between law in England and in India—Weapon used effects definition of murder—Tetanus—Caution necessary in forming opinion whether tetanus caused by wound—Erysipelas—Delirium tremens—Death from surgical operations 55–64

CHAPTER VI.

CIRCUMSTANTIAL EVIDENCE.

The dress—Murder or suicide—Situation of wounds—Nature and extent of a wound—Direction of a wound—Suicide intended to cause suspicion of murder—Circumstances to be noted at the time of finding the body—Marks of blood—Characters of blood-stains—Ocular inspection of blood-stains—Microscopic demonstration of blood-stains—Action of water on blood-stains—Action of heat on blood-stains—Action of caustic potash on blood-stains—Action of nitric acid on blood-stains—Action of guaiacum on blood-stains—Hæmin crystals produced by treating blood with glacial acetic acid—Spectroscopic appearances—Menstrual blood—Marks of blood not necessarily found on clothes of murderer 69–79

CHAPTER VII.

PROGRESS OF DECOMPOSITION AND INFERENCE REGARDING THE TIME OF DEATH.

Importance of question regarding how long body has been dead—Decomposition—Period in which body cools—*Rigor mortis*—Cadaveric rigidity—Duration of cadaveric rigidity—Commencement of cadaveric rigidity—Four stages of decomposition—First stage of decomposition—Second stage of decomposition—

PAGE.

Third stage of decomposition—Fourth stage of decomposition—Internal warmth preserved after rigidity—Hypostases—Hypostasis occurs before putrefaction—Difference between vital and *post-mortem* ecchymosis—Changes produced by putrefaction—Mistaken appearance of poisoning by mineral acids—Melanosis mistaken for effect of sulphuric or oxalic acid or caustic alkalies—Ulcerations of stomach and intestines—Softening and perforation of stomach—Putrefaction causes change in colour of skin—Period of discoloration—Fat bodies putrefy sooner than thin bodies—Circumstances which promote and retard putrefaction—Period of appearance of vesications—Period of appearance of immature maggots or the ova of flies—Period of appearance of mature or moving maggots shorter in India than in England—Rate of putrefaction—Opinion as to time of death from state of putrefaction—Decomposition in air, earth, and water—Buoyancy of decomposed body in water—Notes of a river accident, regarding buoyancy of dead body . 84–102

CHAPTER VIII.

WOUNDS, RUPTURES, AND OTHER INJURIES AS AFFECTING DIFFERENT PARTS OF THE BODY.

Wounds of the head—Difference between concussion of the brain and intoxication—Fractures of the skull—Wounds on the face—Injuries to the spine—Incised wounds to the chest—Torture by *Bansdola*—Confessions obtained by police—Confessions made to police inadmissible as evidence—Ordinary occurrence in evidence of police officers—Extortion of confessions—Pressure on the chest as a means of extorting confessions—Cases of sudden death in lunatic asylums—Rupture of internal organs the result of violent injuries to chest and abdomen—Wounds of the lungs—Wounds of the heart. 106–116

CHAPTER IX.

RUPTURE OF INTERNAL ORGANS.

Deaths from rupture of internal organs—Order of frequency of rupture of internal organs—Organs most frequently ruptured—Spleen most frequently ruptured—Rupture of the spleen—Symptoms of rupture of spleen—Prognosis of rupture of spleen—Treatment of rupture of spleen—Treatment of rupture of spleen in case of internal hæmorrhage—Further remarks on rup-

PAGE.

ture of the spleen—Statistics of uncomplicated rupture of spleen—Cause of rupture—Particulars of cause of rupture of spleen—Causes assigned for homicidal cases of rupture of spleen—Race and sex of cases of rupture of the spleen—External marks of violence in cases of rupture of spleen—Size of the spleen—Position and size of rupture of the spleen—Cause of death in cases of rupture of spleen—Condition of spleen in cases of rupture—Weight of spleen in cases of rupture—Statistics of complicated ruptures of the spleen—Causes of rupture of spleen—Reasons assigned for accidents—External marks of violence—Condition of spleen in foregoing cases—Size of spleen—Nature of ruptures of spleen—Situations of ruptures—Period of survival after rupture of spleen—Causes of death resulting from rupture of spleen—Percentage of causes of complicated ruptures of spleen—Nature of injuries caused to spleen—Rupture of the liver—Causes of rupture of liver—Symptoms of rupture of liver—Prognosis of rupture of liver—Ruptures of liver most common in Calcutta—Ruptures of liver only—Statistics of rupture of liver—Causes assigned for accidental cases of rupture of liver—Condition of liver in cases of rupture—Nature of ruptures of liver—Position of ruptures of liver—Size of ruptures of liver—Cause of death in cases of rupture of liver—Region where blood was effused from liver—Period of survival after rupture of liver—Analysis of causes of rupture of liver—External marks of violence—Fractured bones as complications—Diseased liver as complication—Ruptures as complication—Hæmorrhage as complication—Blood in abdominal cavity—Quantity of blood extravasated—Time between injury and death—Rupture of the bowel—Rupture of bowel caused by severe contusion—Rupture of the intestine—Rupture of intestines—Analysis of cases of ruptures of intestines—Nature of substances extravasated into abdominal cavity—Length of time deceased survived after the accident—Cause of death—Injuries to the abdomen—Remarkable case of complicated rupture of liver, spleen and kidney—Wounds to the bladder and gall bladder generally prove fatal—Rupture of the heart—Wounds of the heart—Fatality in cases of wounds and rupture of the heart—Signs of wound of the heart—Case of rupture of spleen recorded by Chevers—Period of survival in case of rupture of spleen—Mutilation as a punishment—Difficulty in defining cause of fracture—Fractures during life and after death—Fractures as affecting locomotion—Gun-shot wounds—Gun-shot wounds of entrance—Appearance of gun-shot wound from conical or round bullet—Nature of gun-shot injury depends upon distance from which gun was fired—

PAGE.

Gun-shot wound—Premeditation defined in case of gun-shot wounds—Curious case of suicide by pistol-shot—Presumption in case of gun-shot wound in temple or mouth—Blank charge often causes wound like gun-shot wound—Flash of discharge not unfrequently renders assassin's face distinguishable—Cut-throat 122-150

SECTION II.

CHAPTER I.

DROWNING.

Statistics of deaths from violence—Causes of suicides in India—Asphyxia—Drowning—External appearances in cases of drowning—Abrasions and wounds on bodies after death from drowning—Resumé of external appearances of drowned body—Liquid blood in cases of drowning—Internal appearances after death by drowning—The heart after death by drowning—The brain after death by drowning—Abstract of external and internal appearances present in cases of death by drowning—Summary of proofs of death by drowning—Death before submersion—Condition of drowned bodies when examined—Resumé of *post-mortem* appearances in body of drowned—Accidental deaths and suicides—Percentage of unmixed asphyxia in cases of drowning—Mode of death in cases of drowning—Causes assigned for drowning—Causes of suicide—Where drowned—Those drowned in the river Hooghly—Statistics of suicides and accidental deaths—Mr. Gribble's article in the *Madras Times*—Mr. Gribble's article in the *Madras Times* continued—Mr. Gribble's article in the *Madras Times* concluded—The *Lancet* on increase of suicide—Cases of suicide—Effects of destitution on suicide—Over-poison as a cause of suicide—Effects-of religion on suicide—Statistics of accidental deaths in Madras—Treatment of the drowned—Method of restoring animal heat—Methods of artificial respiration—Howard's method of artificial respiration—Sylvester's method of artificial respiration—Marshall Hall's method of a rtificial respiration 157-185

CHAPTER II.

HANGING AND STRANGULATION.

Cause of death—Apoplexy or asphyxia—Dr. MacKenzie's statistics of cases of hanging—Judicial hanging—Mark of ligature on the neck—Hanging usually due to suicide—Points to be noted when hanged body first discovered—The Suriyana Kovil case of alleged

PAGE.

suicide—Necessity for noting every appearance at first examination of a body—Case of Mahabir charged with murder—Details to be observed in cases of alleged suicide—Emission of semen and fæces—Strangling—Death by strangulation without marks of injuries—Death can be caused by hanging without body being suspended—Statistics of incomplete hanging—Cord should be examined in cases of hanged bodies—Warmth of body important evidence—External appearances in death by hanging—Internal appearances in death by hanging—Case of murder by suffocation—Death by strangulation—Different modes of strangulation—Throttling—Marks on the throat in death by epilepsy—Mark round the neck may be due to hypostasis—Statistics of *post-mortem* conditions in cases of death by suicide—Nature of cord used by suicides—Remarks on above-cited cases of suicide—Outlines for examination and inspection of bodies in cases of hanging or strangulation . . . 193–217

CHAPTER III.

ASPHYXIA—SUFFOCATION.

Definition of suffocation—Various kinds of smothering—Suicidal suffocation—*Post-mortem* appearances in death from suffocation—Homicide by suffocation—Methods of homicidal suffocation—Suicidal strangulation with hair—Suffocation the result of certain diseased states—Smothering by sand—Abnormal causes of smothering. 218–222

CHAPTER IV.

SUFFOCATION FROM GASES—BURYING ALIVE—SUICIDES.

Suffocation from inhalation of noxious gases—Deaths from lightning—Burying alive—Burying alive of lepers—Witch-swinging—Burying alive of widow with her deceased husband—Murder by suffocation—Statistics of suicides—Causes of suicide—Physical suffering—Grief, shame, and anger—Revenge—Suicide from religious feeling—Suicide by *Suttee*—Method of investigation in cases of supposed suicide 226–233

CHAPTER V.

SUN-STROKE, LIGHTNINGSTROKE, STARVATION.

Results of excessive heat—Temperature of human body—Death from heat—Effect on system of exposure to heat—Sunstroke—

PAGE.

Lightningstroke—Chronic starvation—Symptoms and signs of chronic starvation 234-237

SECTION III.

CHAPTER I.

RAPE.

Rape—Examination in case of rape—Traces of injury on adults—Case of rape at age 47—Defloration not sufficient proof of rape—Caution necessary regarding charges of rape on young girls—Examination of linen for blood—Caste and position of child's parents—Blood-stains and spermatozoa—Destruction of the hymen—Marks of apparent venereal disease apt to be misleading—False charge of rape—Injuries caused by rape on a virgin—Signs of rape in the dead—Death from hæmorrhage after rape—Age when Native girls attain puberty—Age when European girls attain puberty in India—Marriage of Native girls—Difference between English and Indian law regarding rape—Woman's previous conduct does not affect charge of rape—Woman's statement in charge of rape must be received with great caution—Presumption in favour of woman in charge of rape—Man cannot be convicted of rape on his own wife—Statements regarding age unreliable—What constitutes rape—Medical examination necessary as soon as complaint of rape is made—*Post-mortem* after death from rape—Special point for examination in cases of rape—Traces left of means employed to commit rape . . 238-257

CHAPTER II.

INFANTICIDE AND FŒTICIDE.

Infanticide common in all countries—Two forms of infanticide exist—Infanticide—Essential point to be proved in infanticide—Children born before seventh month rarely live—Uterine existence divided into two parts—Evidence regarding pregnancy—Evidence usually produced to prove pregnancy—Law regarding proof of infanticide—Case of infanticide at Cuddapah—Natural and criminal abortions—Hydrostatic test as to whether child born alive—Guy's objections to hydrostatic test—Evidence of those who witnessed birth of child sufficient—Suspended ani-

PAGE.

mation—Marks of violence no proof of murder—Lung test in case of strangulation of infant—Important changes after infant has breathed—Changes before and after respiration—Death of fœtus due to either precipitate labour or criminal violence—Determination of cause of death of fœtus—Causes of death of fœtus—Rupture of umbilical cord—Fracture of skull of newly born infants—Summary of facts regarding live birth—Whether fœtus born dead or alive—Taylor's Summary of infanticide—Taylor's Summary regarding injuries to infants—*Resumé* regarding infanticide—Medical evidence—Decrease of infanticide in recent years—Special points for consideration regarding infanticide 264-281

CHAPTER III.

ABORTION, LEGITIMACY, AND PREGNANCY.

Abortion—Duties of medical officers in cases of abortion—Examination of the female during life—Examination of the body of the mother, if dead—Examination of substances expelled from the womb—Examination of instruments and drugs in the possession of the accused—Signs of wound irritant poisoning, etc., in cases of abortion—Death during menstrual period—Presumption as to legitimacy—Ground on which child's legitimacy may be disputed—Medico-legal questions when legitimacy disputed—Questions in case of contested legitimacy arise in divorce suits—Case of how long child lived after birth—Examination of woman during life in case of abortion—Symptoms to be observed before ordinary signs of abortion—Signs of abortion in the living—Affiliation cases—Determination of existence of pregnancy . . 284-293

CHAPTER IV.

ABORTION AND EXPOSURE OF INFANTS.

Abortion of infants—Miscarriage with or without woman's consent—Period of quickening—Methods of causing abortion and drugs used—Means employed for obtaining miscarriage—Doubts as to miscarriage—Suspicion of death from abortion—*Post-mortem* delivery of fœtus—Death from grangrene if stick breaks—Professional aborters—Responsibility for giving abortive drugs—Difference between English and Indian Law regarding abortion—Medical man applied to for abortive drugs—Premature confinement by operation—Pregnancy not necessary in England

PAGE.

to establish crime—Blood in abortion—Exposure of infants—Anomaly as regards responsibility—Case of midwife claiming maternity of child—Supposititious children—Justifiable miscarriage—Premature expulsion of contents of uterus—Artificial induction of premature labour—Criminal miscarriage—Penal Code regarding miscarriage—Penal Code regarding effect miscarriage has on child—Attempt to cause miscarriage how dealt with—Causing miscarriage an offence in India—Causing miscarriage punishable in England 294–307

CHAPTER V.

UNNATURAL OFFENCES—SODOMY, BESTIALITY.

What constitutes sodomy—Peculiarities of sodomites—Sodomites affect society of their own sex—Sodomites free from hereditary taint—Medical appearances of sodomites—Genital organs of sodomites—Appearance of anus of sodomites—Marks of violence on sodomites unusual—*Post-mortem* examination of sodomites—Statements of medical witness—Examination in cases of sodomy—Definition of bestiality—Human spermatozoa and animal hairs—Examination in cases of bestiality 308–314

SECTION IV.

CHAPTER I.

LIFE INSURANCE.

Life insurance defined—Policy of insurance—Various forms of insurance—Life Insurance Companies—Uncertainty of human life—Life insurance how based—Life insurance considered with Willich's formula—The term "Life Table" defined—English Life Tables—Health of applicant for insurance—Medical examination—Remarks on life insurance—Details of examination for life insurance—Nervous system of applicant for insurance—Pulmonary diseases of applicant for insurance—Urinary diseases of applicant for insurance—Occupation of the applicant for insurance—Other condition in applicants for insurance—Family history of applicant for insurance—Testing the urine—Albumen as affecting life risk—Persistent albuminuria—Specific gravity of urine—Microscopic test of urine—Indication of diabetes—Diseases requiring special remarks—Cancer—Corpulency—Phthisis and lung diseases—Phthisical tendency in descend-

PAGE.

ants—Statistics of phthisical patients—Analysis of phthisical patients—Rules regarding lives of consumptives—Addition to life—Adverse influences in life insurance—Table of average expectation of life—Expectation of life reduced in India—Discharge from the ear—Gout—Heart disease in insurance—Rheumatism in insurance—Stricture of the urethra—Enlargement of liver—Enlargement of spleen—Legal points—Material concealment—Medical examiners—Concealment by applicant—Risk of concealment—Intemperance in insurance—Burden of evidence—Abstinence in insurance—Accidental cases of death in insurance—Suicide in insurance—Murder for insurance . . 315-337

CHAPTER II

INSANITY.

Definition of insanity—Delusions—Hallucinations—Illusions—Difference between hallucinations and illusions—Lucid interval—Definition of insanity—Diagnosis of insanity—Symptoms of insanity—Other symptoms of insanity—Associations of incipient insanity—Difference between eccentricity and insanity—Errors regarding insanity—Mental unsoundness—Diagnosis of feigned insanity—Indications of feigned insanity—Importance of previous history—Difference between feigned and real insane—Insanity feigned by ignorant and common people—Insanity feigned for various reasons—Means to be adopted in detecting insanity—Conduct of insane—Causes of insanity—Moral causes of insanity—Physical causes of insanity—Prognosis of insanity—Idiocy—Insanity from sexual intercourse and other causes—Tuberculosis in insanes—Classification of mental disorders—Hypochondriasis—Mania—Commencement of mania—Features of mania—Symptoms common in mania—Mania distinguished—Delirium tremens—Meningitis—Delirium in febrile state—Melancholia—Symptoms of melancholia—Bodily health in melancholia—Religious melancholia—Dementia—The mind in dementia—Primary dementia—Demented patients—Symptoms of dementia—Diagnosis of dementia—Acute dementia—Idiocy—Manifestation of idiocy—Imbecility—Classes of imbecility—Moral imbecility—General paralysis—Symptoms of general paralysis—Puerperal mania—Insanity of pubescence—Climacteric insanity—Senile insanity—Acoholic insanity—Symptoms of alcoholic insanity—Progressive dementia—Dipsomania—Insanity due to alcohol—Gout or rheumatism—Lead poisoning—Epilepsy—Mental weakness—Insanity from sunstroke—Diseases in which insanity may appear—Phthisis pul-

PAGE.

monalis—Worms—Blows or falls on the head—Venereal disease produces insanity—Monomania—Features of monomania. . 338-368

CHAPTER III.

INSANITY AS AFFECTING RESPONSIBILITY.

Definition of insanity—Insanity and unsound mind—Unsoundness of mind as regards accused—Criminal responsibility of insanes—Criminal responsibility of insanes—Unsoundness of mind must be complete—Direction of jury—Drunkenness—Unsoundness of mind when called upon to plead—Deaf and dumb treated as persons of unsound mind—Prisoner's intelligence—Indian law requires amendment—Insanity as affecting a witness—Deaf-mutes as witnesses—Testamentary capacity—Test of capacity to make a will—Will valid if mind unimpaired—Insanity as affecting civil rights and liberty—Restraint of lunatics—Law on commitment of insanes to lunatic asylums 369-380

SECTION V.

CHAPTER I.

POISONS.

Definition of poison—General characters of symptoms of poisoning—Channels of access of poisons to the system—Local action of poisons—General evidence of poisoning—Effects produced by poisons—Manner of conducting inquiries in cases of suspected poisoning—Channels for getting rid of poisons—Points to be noted in cases of alleged poisoning—Medical officer's duty—Clean vessels a necessity—Errors regarding arsenic poisoning—Possibility of case of poisoning even if poison not found—Evidence of poisoning how obtained—Experiments on animals with suspected substances—Comparative experiments on animals—Statistics of poisoning—Non-alkaloidal irritants—Untraceable poisons—Action of poisons may be modified under various conditions—Dr. Van Steyzen's remarks on poisons—Extracts from Madras Administration report—Poisons most generally used—Statistics of poisoning in Madras—Statistics of human poisoning in Bombay—Statistics of human poisoning in Bengal 381-401

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PAGE

CHAPTER II.

POISONOUS IRRITANTS AND ARSENIC.

Three classes of poisons—Action of poison how modified—Irritant poisons—Difference between corrosive and irritant poisons—Diseases whose symptoms resemble irritant poisoning—Irritant poison—Cholera—English cholera—Gastritis—Enteritis—Peretonitis—Perforation of the stomach—Hernia—Intussusception of the bowels—Colic—Statistics of cases of arsenic poisoning—Attempts at poisoning by arsenic—Case of Kimidi Maharani, poisoned with white arsenic—Common forms of arsenic—Various forms of arsenic distinguished by color—White arsenic and arsenicum—Legitimate uses of arsenic—Criminal poisoning by arsenic—Symptoms of arsenic poisoning—Arsenic-eaters—Arsenic used for art purposes—Arsenic externally applied or inhaled—White arsenic—Poisoning by arsenic in acute form—Anomalous occurrences in arsenic poisoning—Poisoning by arsenic in chronic form—Similarity of arsenic poisoning to cholera—Recoveries from arsenic poisoning—Amount of arsenic found in liver—False charge of arsenic poisoning—Deaths from arsenic poisoning frequently recorded as cholera—Suicidal cases—Arsenic an indestructible poison—Trials for arsenic poisoning—Treatment in arsenic poisoning—Antidote for arsenic—Stimulants—Child-poisoning—Arrest of decomposition—Cattle poisoning—Statistics of cattle poisoning—Accidental deaths due to unrestricted sale of poisons—Fatal dose—Statistics of arsenic poisoning in Madras 402–423

CHAPTER III.

ANTIMONY AND OTHER METALLIC POISONS.

Antimony—Symptoms of acute antimonial poisoning—Symptoms of chronic antimonial poisoning—Antidotes for antimonial poisoning—Medicinal uses of antimony—English cases of antimonial poisoning—Mercury—Symptoms of acute mercurial poisoning—Symptoms of chronic mercurial poisoning—Antidotes for mercurial poisoning—Medicinal uses of mercury—List of patent medicines containing mercury—Statistics of mercurial poisoning—Symptoms of acute copper poisoning—Symptoms of chronic copper poisoning—Country arrack contains copper—Lead, zinc, and iron as poisons rarely used. 424–432

PAGE.

CHAPTER IV.

ACIDS AND ALKALIES.

Sulphuric acid poisoning—Quantity of sulphuric acid required for fatal dose—Symptoms of sulphuric acid poisoning—Treatment in sulphuric acid poisoning—Hydrochloric acid poisoning—Nitric acid poisoning—Ammonia poisoning—Symptoms of ammonia poisoning—Treatment and antidote in ammonia poisoning—Caustic potash, soda, potassium, etc.—Volatile acids, petroleum, etc.—Camphor poisoning—Symptoms of camphor poisoning—Treatment and antidotes for camphor poisoning—Alcohol poisoning—Ether, chloroform, and chloral poisoning—Carbolic acid poisoning—Symptoms of corbolic acid poisoning—Fatal dose of carbolic acid—Case of carbolic acid poisoning—Treatment and antidote in carbolic acid poisoning—Prussic acid poisoning—Case of prussic acid poisoning—Fatal dose of prussic acid—Treatment and antidote for prussic acid poisoning—*Post-mortem* appearances in prussic acid poisoning 433–444

CHAPTER V.

VEGETABLE POISONS.

Vegetable poisons—Aconite poisoning—Difficulty of detecting aconite poisoning—The aconite shrub—Statistics of aconite poisoning—Symptoms of aconite poisoning—Medicinal use of aconite—Treatment and antidotes for aconite poisoning—General remarks on aconite—Statistics of aconite poisoning—Strychnine—Characteristics of strychnine—Case of strychnine poisoning——Difficulty of detection of strychnine poisoning—Statistics of deaths from nux vomica and strychnine—Quantity of strychnine likely to prove fatal—Symptoms of strychnine poisoning—Table of diagnosis of death by strychnine—*Post-mortem* appearances in death from strychnine poisoning—Treatment in strychnine poisoning—Nux vomica eaters—Strychnos tetanus or disease tetanus—Description of atropine or daturine—History and statistics of datura poison in India—English statistics of death from atropine—Dhatura poisoning in India—Fatal dose of atropine—Symptoms of datura poisoning—Chronic poisoning by atropine—Treatment in atropine poisoning—Remarks regarding datura—Various appellations for Indian hemp or cannabis Indica—Effects of cannabis Indica—Ganjah-smoking—Fatal results—Murder under influence of bhang—Curious case of poisoning—Symptoms of tincture of cannabis on delicate women—Canna-

PAGE.

bis used as an intoxicant—Aconite used as a poison—Opium—Medicinal use of opium—Statistics of opium poisoning—Opium-eating and opium-smoking—Ordinary dose of opium—Fatal doses of opium—Statistics of opium poisoning—Symptoms of opium poisoning—Antidotes to opium poisoning—*Post-mortem* appearances of opium poisoning—Other vegetable poisons—Remarks regarding poison—Statistics of vegetable poisoning . . . 445–473

CHAPTER VI.

ANIMAL POISONS.

Amphibia—Scorpions—Centepedes and spiders—Bees, wasps, and hornets—Lizards—Poisonous fish—Shell-fish—The globe fish—Varieties of fish poisoning—Sea-snakes—Flesh of diseased animals—Cysticerci—Septic poisons—Cantharides—Ptomaine poisoning 481-487

CHAPTER VII.

SNAKE-POISONS.

Snake-poisons—Poisonous snakes—Classes of poisonous snakes—Poisonous colubrine snakes—Viperine snakes—Terrestrial snakes—Indian snakes—Action of snake poison—Action of snake poison on nervous system—Action of snake poison on blood—Transmission of snake poison—Treatment of snake-bite—Condy's Fluid renders snake poison inert—Only method of treatment of snake-bite—Cure for snake-bite—Mechanical irritants—Pounded glass as a mechanical poison—Diamond dust as a mechanical poison—Chopped hair as a mechanical poison . 489-498

OUTLINES

OF

MEDICAL JURISPRUDENCE FOR INDIA.

SECTION I.—METHOD OF INVESTIGATING MEDICO-LEGAL CASES IN INDIA.

CHAPTER I.

INTRODUCTION.

Preliminary remarks—Scope and object of this book—Necessity of some knowledge of medical jurisprudence—Necessity for careful observation —Marks found on dead bodies—Medical reports, what they should contain—Only facts should be recorded, without any expression of opinion on the facts—Caution to be exercised before expressing an opinion—Evidence in regard to scars—Examination of external wounds —Wounds caused before or after death—*Post-mortem* examination of decomposed body—Whether body warm or cold when found—Points to be noted when a body is found—The inquest—Police notes.

Preliminary remarks.

MEDICAL JURISPRUDENCE, LEGAL or FORENSIC MEDICINE, is that branch of medical science which treats of the various connections between Law and Medicine. It deals with all medico-legal subjects related to the administration of justice, and also with certain cases involving questions of the civil and social duties of individuals. Briefly, then, medical jurisprudence is the application of the science of medicine in all its branches to legal purposes. Some authors claim for medical jurisprudence a very wide field, but it is not the object of this book to discuss more than the outlines of the subject, a knowledge of which is required for the criminal cases which come before the Indian courts

of law. Nor is it supposed that the scientific witness will gain any more help from a perusal of this book than he possesses from his own knowledge. There is, however, a very large class of men in this country, who, though their daily avocations bring them into contact with the criminal courts, have little or no knowledge of medical jurisprudence. Police vakeels and magistrates are apt to consider that a knowledge of medical jurisprudence can only be acquired with a knowledge of medicine, and the consequence is, that there are many trials which are carried through their various stages without the slightest enquiry into medico-legal* points which are of the utmost importance, and an elementary knowledge of which might possibly save many an innocent man from punishment, or obtain the conviction of the guilty. It is for such a class of persons that this book is intended; and it does not profess to give more than the outlines of the science, with such practical hints, obtained from many years experience, as may prove of service in the conduct of criminal cases. It simply opens a door, through which the student may see the many vast halls through which he has to go before he can pretend to be a real master of the science.

Scope and object of this book.

Necessity of some knowledge of medical jurisprudence.

2. Dr. Taylor, one of the most eminent of medical jurisprudents, stated: "Medico-legal knowledge does not consist so much in the acquisition of facts, as in the power of arranging them, and in applying to the purposes of the law the conclusions to which they lead. A man may be a most skilful surgeon, or a most experienced physician; his mind may be well stored with professional information; yet, if he is unable by the use of simple language to make his ideas known to others, his knowledge will be of no avail. One far below him in professional standing and experience may make a better medical witness." In the same way, it may be said that any man with ordinary common sense, and the talent of arranging facts, may, after mastering the rudiments of medical jurisprudence, be able

* Pertaining to law, as affected by medical facts.—*Dunglison.*

to prosecute or defend a case with success. Writers on medical jurisprudence are almost exclusively medical men; their readers are chiefly medical men or medical students, and the information is given with a view to the witness-box, where the medical man plays so important a part. Of course, without a scientific training in medicine, the student cannot expect that his opinion will be called for as an expert; but a witness, however great his knowledge may be, can only give his evidence in answer to questions put to him. It follows, therefore, that in order to be able to examine or cross-examine a witness properly, the vakeel or lawyer must have a knowledge of the questions to be asked, and it will depend upon the questions that he puts, whether he will be successful in eliciting from the witness all the facts that bear upon the case. The examination of a medical witness in this country is only too often of a most perfunctory character, and there is frequently no cross-examination at all. In the majority of cases before the magistrates, the prisoner is never defended, and, unless he is a well-to-do man, he is generally undefended even in the higher courts. This is a matter much to be regretted, and there is a great deal in what has often been urged in the Public press, that public defenders should be appointed as well as public prosecutors. As regards the police and the subordinate magistrates, if they possessed a better knowledge of the elements of medical jurisprudence, they would be able better to understand the points to be worked out, and would take more pains than they do at present to record even the minutest details. Medical men are by no means infallible, though they are often inclined to be dogmatic, or, as Taylor says, "they are apt to confound what is mere matter of belief with proof." During late years the science of medical jurisprudence has made great strides. In the majority of cases certain facts have become established; and in other cases it has been shown that symptoms,* at one

* *Symptoms* are those phases or changes which occur synchronously with a disease, and which serve to indicate the nature and position of that disease. Symptoms are of two kinds—*subjective*, or those felt or observed by the patient, and *objective*, or those observed by the physician.

time considered certain tests, are no longer so. It should no longer be possible for a medical witness to dogmatise unless he can show his reasons for so doing. If he cannot do that, and has merely his own opinion to set against the received authorities, his evidence is of little value.

Necessity for careful observation.

3. It has been remarked by a learned Scotch Judge in a trial for murder, where the prisoner was acquitted mainly owing to carelessness of observation when the body was first seen, that "*a medical man, when he sees a dead body, should notice everything.*" In this country it rarely happens that a medical man sees a body when it is first found. It is generally sent to him for examination many hours after death has occurred. In nine cases out of ten the preliminary examination is conducted by the police and the village authorities. Upon them, therefore, devolves that first and most important duty of observation. It is, however, melancholy to find how grievously this duty is in most cases neglected. The inquest paper, or *mahazarnamah*, prepared by the police and village authorities is generally most unsatisfactory, and it almost always happens that evidence is elicited at the trial regarding the state and position of the body and its surroundings which have found no mention in the inquest paper. This carelessness opens the door to concocted evidence on one side or the other, and it must be remembered that subsequent evidence of facts, not mentioned in the first report, is always open to suspicion. To take one point which is alluded to further on in the text. We can recall to mind but few cases of murder in which the witnesses who were present at the finding of the body have been able to say whether it was cold or warm. Even in England, this is a point which Taylor says is frequently omitted to be observed, and, as he justly remarks, this omission "may give rise to great inconvenience, if not to a failure of justice." To those persons whose duty it is to collect the evidence for the prosecution, it may be said that every omission in the matter of observation is a point which the prisoner can advance in his favour. Whether he will do so or not is another matter. If he is an ignorant man, and is undefended, omis-

sions will probably not be noticed; but if we have a clever vakeel or lawyer to cross-examine us, one who knows something of medical jurisprudence, we may feel sure that his questions will turn, not so much upon what we have observed, but upon what we have neglected to notice. Each omission will then become a weapon of defence.

Marks found on dead bodies.

4. It frequently happens that a medical witness says that, on examination of a dead body, he has found marks of blows, but it very rarely occurs to the prisoner's vakeel to ask the witness whether he has applied the only reliable test for distinguishing between *false ecchymosis* (or *hypostasis*)* and *true ecchymosis, viz.*, incision. It is probable that many sub-magistrates and vakeels are not aware that there are certain *post-mortem* appearances which exactly simulate marks caused by blows, and if the medical witness has not applied the test, his opinion regarding the cause of these marks is worthless. Mr. Gribble has had a medical witness before him who, on being questioned, did not even know what hypostasis meant.

Medical reports, what they should contain.

5. Medical officers who conduct an examination, or a *post-mortem*, should endeavour, as much as possible, to avoid technical terms in their report. The report is not intended to give them an opportunity of displaying their learning, but of conveying information to others, which is best done by the use of ordinary and intelligible phraseology. Let us take the case of an apothecary who is sent fresh from college to take charge of a mofussil station and dispensary; if, in his report of an examination of a dead body, he were to say (what has been said in a case quoted by Taylor),—" The only morbid appearance

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**Hypostasis*, *false ecchymosis*, *post-mortem staining*, or *cadaveric lividity* is due to the settling down of the blood in the most dependent parts of the body while the body is cooling after death. It is a certain sign of death, and occurs in deaths from all causes, even when death is due to hæmorrhage, although it would be less marked in this latter case. *True ecchymosis* is due to the extravasation of blood into the loose (cellular) tissue lying beneath the skin, giving rise to a livid discoloration of the surface. It usually arises from a local injury of some kind which causes a laceration or rupture of the sub-lying minute blood vessels, called *capillaries*.

of the brain was an atheromatous deposit* in the Pons Varolii,† near the situation of the *locus niger*,"‡ it is ten chances to one that the sub-magistrate to whom this report comes will not be any wiser than before.

Taylor gives another amusing instance of this. A medical man in court was describing the injuries he had found on the prosecutor. He said that he had found him suffering from "a severe contusion§ of the integuments|| under the left orbit, with great extravasation of blood and ecchymosis in the surrounding cellular tissue, which was in a tumified¶ state."

Judge.—'You mean, I suppose, that the man had a bad black eye?'

Witness.—'Yes.'

Judge.—'Then why not say so at once?'

Knowledge, which is locked up, as it were, in technical terms, is of no use except to the possessor of the key. It may be very useful to the owner of the key; but, like a miser's wealth, it is of no good to any one else. If we wish our knowledge to be of any use to others, we must make ourselves understood.

Only facts should be recorded, without any expression of opinion on the facts.

6. Avoid, as far as possible, the expression of any opinion. Record facts, and wait until your opinion on those facts may be asked for. Mr. Gribble remembers a case of considerable importance—it is discussed in detail hereafter as the Suriyana Kovil Case—in which a body was found

* The word *atheromatous* is the adjectivial form of the term atheroma, which is a form of degeneration of the walls of the arteries as the result of a chronic inflammatory process. Atheromatous degeneration of arteries frequently terminates in the formation of cheesy (or caseous) material which is "deposited" in the walls.

† *Pons Varolii* is the term given to the lowest part of the brain, except the medulla oblongata, which is the link of communication between the spinal cord and the brain.

‡ The *locus niger* or "black spot" is a part of the *Pons Varolii*.

§ A bruise; an injury without breach of the skin.

|| Skin.

¶ Swollen.

hanging. The apothecary who first examined the body gave it as his opinion that death had been caused by hanging, and that owing to the absence of any marks of violence, the hanging had been suicidal. It is clear that the latter part of this opinion was premature. All that was wanted was an opinion as to the cause of death. Whether it was a case of suicide or of homicide was for the magistrate and the judge to decide, and could depend only on the evidence.

In another case, an apothecary swore that he believed the prisoner had caused an abortion by inserting a stick into the woman's private parts. There was no doubt about the woman having been delivered; the only question was whether it was an abortion self-caused or an ordinary miscarriage. The apothecary had examined the woman three days after the delivery. There was then no *lochial* discharge,* and all the symptoms that he could describe consisted in a slight redness of the parts. It transpired that when the woman was brought for examination, the apothecary was told that she was suspected of having caused abortion. In conducting an examination, the medical man should not allow himself to be prejudiced by statements of the case from the police or the parties interested. He should state what he finds, and found his opinion simply upon those facts and nothing else, and the result will be far more satisfactory to the court before which the evidence has to be recorded. Dr. Casper, the eminent German medical jurisprudent, was a striking example of the value of medical evidence founded on a thorough independent examination. He was most cautious in forming an opinion, but when he did so, it carried double weight. Two of his reports are given as an example of what a report should be in the chapter on "Strangulation."†

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* The lochial discharge, or *lochia,* is the semi-sanguineous discharge that takes place from the genital organs during the two to four weeks succeeding labour.

† *Strangulation,* in medico-legal phraseology, is a term used to denote constriction of the neck by a ligature around the neck so as to prevent air entering the lungs; the body is not suspended as in hanging—the weight of the body having nothing to do with the constricting force.

Caution to be exercised before expressing an opinion.

7. In this country especially, a medical witness should be most cautious in giving his opinion as to the cause of death. It often occurs that the ostensible cause of death is not the actual cause. For instance, it does not follow that in the case of a body found hanging, the cause of death *was* hanging. The body may have been hung up after death, but death may have been first caused by injuries, or possibly, by poison. Instances have occurred in which poison has been found in the stomachs of bodies found hanging. Dr. Chevers alludes to the frequency of the practice in this country of hanging up the bodies of persons who have been otherwise murdered. This is a subject which will be discussed in more detail in the chapter on *Hanging,* and is only alluded to here in order to point out the necessity of a thorough *post-mortem* examination in all cases, even when there is seemingly an ostensible cause of death.

In giving evidence as a witness, the medical man should—

(*a*) speak loudly and distinctly;
(*b*) answer questions categorically—"Yes" or "No";
(*c*) never use superlatives;
(*d*) give answers irrespective of the possible results of trial;
(*e*) express no opinion as to the guilt of the prisoner, but state facts only;
(*f*) avoid using technical terms; and
(*g*) avoid long discussions, especially theoretical arguments.*

Evidence in regard to scars.

8. Questions may arise in the evidence of a medical witness in regard to the age of scars and to the possibility of scars and tattoo marks disappearing. Regarding scars, Casper said: "Scars occasioned by actual loss of substance, or by a wound healed by granulation, never disappear, and are always to be seen upon the body; but the scars of leech bites, or of lancet wounds, or of cupping instruments, may disappear after a lapse of time that cannot be more

* Husband's *Forensic Medicine and Medical Police.* Fifth Ed., p. 17.

distinctly specified, and may therefore cease to be visible upon the body. It is extremely difficult, if not impossible, to give any certain or positive opinion as to the age of a scar." A change of atmospheric temperature may cause the reappearance of scars that have apparently vanished. Slapping the part may likewise do so. Scars in children grow in length only. The manner of production of the wound and the nature of the healing process affects the shape of the scar. Clean cut or incised wounds leave linear scars, but a wound healing by granulation will probably be irregular in shape. Scars of gun-shot wounds will be irregular and disc-shaped, and adherent to the sub-lying tissue. With regard to tattoo marks, they "may become perfectly effaced during life," especially is this so if vermilion has been used; they are much less likely to disappear if Indian ink is deposited in the skin. It may be remembered that the question of the disappearance of tattoo marks created much discussion in the celebrated Tichbourne case.

Examination of external wounds.

9. Examine most carefully the size and position of all external wounds. The case of *Reg.* v. *Gardner* is one of the leading cases on this point. Here a woman was found dead, her throat cut, and a razor in her right hand. The wound in the throat, however, was in such a direction that it could not possibly have been caused by the right hand, and there were cuts on both hands which could only have been caused in a struggle, proving beyond a doubt that a murder, and not a suicide, had been committed.

Wounds caused before or after death.

10. Be careful in noting any signs which may go to show whether the wounds were caused before or after death. An interesting case, showing the importance of this point, was tried at the Cuddapah Sessions in 1873. The body of a man was found in a well, and certain persons were accused of having thrown him in. There were no external marks of injury except that one of the ears was missing. At the trial, it was urged for the defence, that the deceased had accidentally fallen into the well, and the ear had been

eaten off by fishes, crabs, &c. Although the body had been examined by a medical man directly it was found, there was no reliable evidence to show whether the ear had been cut off before or after death. If it had been cut off before immersion, it is probable that there would have been some contraction of the edges of the wound or some other signs of a natural tendency to heal, which would not be the case if the ear had been bitten off by fishes after death. The accused were acquitted, and the death was held to have been caused by accident.

Post-mortem examination of decomposed body.

11. The Surgeon should not be deterred from a *post-mortem* examination on account of the decomposed state of the body. Of course, there are cases in which decomposition is so advanced that an examination is impossible; but there is good reason to believe that cases occur where decomposition is given as a reason for not holding an examination, when one might really have been held. Dr. Casper once examined the body of a woman who had died ten months previously by falling into a cess-pool. Not only was the body highly decomposed, but a portion had been converted into adipocere.* The woman's master was suspected of having seduced the deceased and of having thrown her into the cess-pool, fearing that she would give birth to a child and the result of the intimacy become known. Casper, knowing that the womb resists the action of decomposition longer than any other part of the body, persisted in his examination, and found that the womb contained no fœtus, and that, therefore, a great part of the suspicion was unfounded.

Whether body warm or cold when found.

12. Be most careful in enquiring whether, when the *body* was found, it was *warm or cold*.† Allusion has already been made to the importance of this point, but the case of

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* *Adipocere* is substance which, in some of its properties, resembles a mixture of fat and wax. It is formed by the exposure of fleshy tissue to moisture, with the exclusion of air, that is embedded in the earth or under water. It consists of fatty acids, combined with ammonium and alkaline earths.

† The rapidity with which the temperature of the body falls after death

Gardner, already mentioned, may be given as an instance. In that case two persons were accused of the murder, and the innocence or guilt of one depended entirely upon the time it takes for a body to cool. The body when found was rigid, and if rigidity could have set in within the space of four hours, the murder must have been committed by the second prisoner, a woman named Humbler, who, for four hours previous to the finding of the body (about 7-30 A. M.), was the only person in the house. If it takes four hours and more for rigidity to set in, which is the time fixed by the most experienced physicians in Europe, the murder must have been committed by Gardner, who, up to that time, was in the house and in the same room with the deceased. Other circumstances tended to fix the guilt upon Gardner, and he was convicted, the woman Humbler being acquitted; but had the body been warm at the time it was found, there can be no doubt that Gardner would have been acquitted and Humbler probably convicted.

Points to be noted when a body is found.

13. In this country, where there are so large a number of deaths reported as from drowning, it would seem advisable that every case of suspicious death should be sent to the nearest hospital for *post-mortem* examination. On receiving notice of a suspicious death, the village authorities should at once send information to the nearest police station,

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varies under different circumstances, as the following table from HUSBAND'S *Forensic Medicine* shows :—

COOLING OF THE BODY.

a. External circumstances.	Covered by bed-clothes, or otherwise unexposed, when cooling will be slower than in cold dry air quickly moving.
b. Condition of body itself.	Slow, if fat.
c. Kind of death.	*a.* Wasting diseases—Quick. *b.* Suffocation—Slow. *c.* Cholera, yellow fever, rheumatic fever, and cerebro-spinal meningitis—Increase of heat after death.

For fuller remarks on this point, see Part II, Chap. I. In no case should a medical man ever *hazard* an opinion as to the cause of death until he has thoroughly satisfied himself on this point, either by a *post-mortem* examination or otherwise.

and the enquiry should commence. The following are some of the points about which the fullest information is necessary and should be available :—

(1) Date, place of making the examination, and names of those who can speak to the identity* of the body ?

(2) When the body was first found, was it warm or cold ? Was it rigid or not ? Was it well or ill nourished ?

(3) Had decomposition set in; if so, how far had it advanced ?

(4) What was the exact time of death ?

(5) When, where, and with whom was the deceased last seen alive ?

(6) What was the exact attitude and position of the body when found ?

(7) Note the position of all surrounding articles, such as bottles, papers, weapons or spilled liquids.

[Note.—These articles should be collected and preserved.]

(8) Note the exact position and size of any marks of blood on the body or in the vicinity. State whether the blood was dry or liquid. Condition of clothes of deceased—torn or disordered.

(9) Did the deceased show any special symptoms ? If so, when were they first noticed, and how long did they continue ? What were his habits ?

(10) How long after partaking of any meal, food, drink, or medicine, did the symptoms occur ?

(11) Did they intermit, or did they continue without mitigation until death ?

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* With regard to identity in the *living*, it should be remembered that the *hair* is often dyed blue black or reddish by the people of India, either for improving the personal appearance, or more rarely, for purposes of disguise. The deception is easily detected. The agents used in the black dying process are salts of lead, or of silver, detected by their chemical tests, and by the fact that the part of the hair nearest the skin often remains unstained. Chlorine or peroxide of hydrogen are used for bleaching the hair ; in this case the hair is rough and unnatural to the feel, and the roots escape the bleaching process.

(12) Secure any portion of the food or medicine which may be suspected to contain poison.

(13) Secure all matter vomited or evacuated.

[*Note.*—When securing food or vomited matter, be most careful to put each matter separately in a *clean* pot or vessel; do not take any old pot, or piece of pot, that may be offered, but insist upon being supplied with a new and clean earthen vessel, which should at once be securely fastened, and, if possible, sealed and carefully guarded, until it is given into the hands of the medical officer.]

(14) Note the external appearance and general colour of the body, and all marks of violence, scars, the products of disease such as ulcers, hernia, &c.

(15) Are there any injuries?

[*Note.*—We should recollect that there may be no external signs of injury and yet death may be due to violence. There is often great difficulty in deciding whether an injury was inflicted before or after death.]

(16) Note the height, determined by measurement, and apparent age.

(17) Note the sex.

[*Note.*—It is only in advanced putrefaction that this is difficult to determine. Hair found only on the pubes is characteristic of the female, but if it extends upwards on the abdomen it is equally so of the male.]

(18) Note the position of the tongue, is it normal or abnormal, injured or not?

(19) The condition and number of the teeth, are they complete or incomplete? Any peculiarity as regards size and form, in order to compare with bite on suspected party, &c.

(20) Condition and contents of the hands and nails. (In the drowned, weeds, sand, and indications of prolonged immersion. In those *shot,* scorching and blackening of the hand from powder, or injury from recoil of the weapon.) Is the weapon grasped firmly in the hand. Cadaveric spasm?

(21) Condition of the natural openings in the body—nose, mouth, vagina, &c. Presence of sand or weeds in the mouth of those found in the water. Presence of marks of the corrosive poisons. Presence or absence of signs of virginity, or of recent injury about the female external generative organs.

(22) Condition of the neck. Presence of marks of strangulation. Any irregularity in the line of the vertebræ. Are there any marks upon the throat or under the ears.

Note any other suspicious circumstance and all statements of suspected parties, ascertaining the business of the deceased (if any) and whether he has experienced any disappointment or misfortune, or whether there is an insurance on his life.

Finally, after having noted these points, and after having caused them to be entered in the *mahazarnamah* or inquest paper, which should be signed by the village authorities, have the body at once taken to the nearest hospital or dispensary. Accompany it there, and take with you all matters and articles connected with the case. Be careful that no unnecessary delay occurs in this respect, for it is of importance that the body should, if possible, arrive at the hospital before decomposition sets in.

The inquest.

14. It very often happens that the inquest held by the village authorities is nothing more than a farce. Owing to their dread of pollution from being brought into contact with a dead body, the members of the inquest often sit down at a distance and afterwards sign the record upon hearsay. *The police officer should insist upon the members of the inquest personally satisfying themselves as to the correctness of the statements in the inquest paper.* This paper should contain full and detailed information on the several points just mentioned. If information is omitted from the inquest paper and subsequently supplied, it is always open to suspicion.

Police notes.

15. The police officer should also remember the necessity of taking full notes for his own information. When called upon to give evidence, he should not attempt to speak merely from memory; but, if he has taken notes, he should ask to be allowed to refer to them. Considerably more weight will be attached to his evidence if it is shown that he exercised an intelligent observation, and if he shows

himself cautious before committing himself to a statement of opinion. If he has omitted to note any special point, it is far better, should he be asked a question, to at once admit the omission, instead of making a guess, which may very possibly be proved to be wrong.

Surgeon-Major Cullen favoured Mr. Gribble with the following remarks :—

"I have had corpses sent me from a distance, the escort "of which having been changed, I could get no information "as to whose corpse it was supposed to be, the Police report "reaching me, perhaps, some hours after or next day; and "I have been obliged to say I examined a body at such an "hour, and said to be brought from such a direction, but "could not say if it was that of deceased.

"A medical man should put private marks on each article "he examines. I have had a case in which I examined "several clothes for blood stains and numbered them, but "in Court I found all my numbers had been changed from "one to the other."

CHAPTER II.

ON EVIDENCE IN INDIA.

False and concocted evidence—Instances of peculiarities of native evidence —Mahomedan law in regard to evidence by proxy—False evidence in a true case—False evidence through fear—False evidence the result of ignorance—Remarks on the evidence of the uneducated class of Natives —False confessions are not uncommon—Zeal of police sometimes carried too far—Concluding remarks.

THE great difficulty with which all magisterial and judicial officers in India have to contend, is the false evidence which daily comes before them.

16. It is probably no exaggeration to say that a case scarcely ever comes before a criminal court in which there is not a certain amount of false or concocted evidence. Even in cases which are substantially true, there is generally a

False and concocted evidence.

certain amount of concocted evidence. This evidence breaks down and is proved to be false, and the result very often is that a true case gets let off. The duty of a judge or a magistrate in this country is, generally speaking, not so much to decide which story is the true one and which the false one, but to separate the falsehood and the truth on both sides, and, having eliminated the former, to decide upon the case. Mr. Holloway, for many years a distinguished judge of the Madras High Court, frequently remarked in his judgments, that the legal maxim, *falsum in uno, falsum in omnibus,** did not apply to this country. In England, the discovery that some of the evidence for the prosecution had clearly been concocted, would probably be quite sufficient to ensure the release of the accused; but if such a rule were to be followed in this country, there would scarcely ever be a conviction.

Instances of peculiarities of native evidence.

17. The native mind is, generally speaking, unable to understand that the truth "unadorned is adorned the most," and a witness, therefore, adds on to what he knows, not so much with the intention of speaking a falsehood, but in order to make the case as safe as possible. Instead of confining himself to what he knows or has seen, he speaks of what he has heard, or what he thinks took place. An amusing instance of this moral perversity is given by Chevers:—

A man named Luxiah-bin-Budiah was tried for perjury at Khandesh (1837). At a trial for highway robbery, this person had given evidence under the name of Kalliah-bin-Dowjee, and had sworn that, on a certain date, he had followed up the footprints of certain robbers, etc. On being cross-examined respecting various particulars which he had not come prepared to answer, he admitted that his name was not Kalliah-bin-Dowjee but Luxiah-bin-Budiah, and further that he was not present when the robbers were traced. He further said that his friend, the *real* Kalliah, was sick and unable to attend the court, and that therefore he came to

* "False in one thing, false in all."

depose for him; that the facts to which he had deposed were perfectly true, and that although he was not himself an eye-witness, yet they were notorious to all the people of the village. He was sentenced to one year's imprisonment with labour and to receive twenty-five stripes.

Mahomedan law in regard to evidence by proxy.

18. On reference to Goodeve, we read that "Mahomedan law, in certain prescribed cases, allowed the singular expedient of giving evidence *by proxy*. In the event of the death of the principal witness, the absence of the witness on a three days' journey, or his sickness, and in a certain class of cases where the judgment was not barred by doubt, a witness, or the person who would have been such, was permitted to supply a proxy, substituting another person to detail facts or opinions for him."

False evidence in a true case.

19. The following case occurred within Mr. Gribble's experience, and shows how false evidence can be brought into a true case. A merchant was passing through a village with a number of bandies laden with timber. A number of Madigas danced the 'sword-dance' in front of the bandies. This is a dance which, when performed, always excites the indignation of the Malas. (These two classes of men form the representatives of the left and right hand castes amongst the Pariahs.) The Malas protested against the dance, a fight followed, and a Mala was so severely wounded that he subsequently died of his injuries. An attempt was made to prove that the merchant had struck the blow of which the Mala died, but when the witnesses came to be cross-examined regarding the details of the fight and what subsequently happened, they broke down entirely. There were minor discrepancies regarding the actual spot where the blow was struck, but three of the witnesses were palpably inconsistent. One said that the deceased, after he had been struck, was carried to the choultry, where he lay insensible for the whole of the night, until the police came next morning; a second said that the deceased, after he was struck, was left on the road, where he remained groaning and insensible the whole night; and the third, a police constable, said that

deceased, immediately after he had been struck, walked about two miles to the next police station, showed his wounds, and laid a complaint against the prisoner! This witness, in describing the injuries, had taken no notice, or no complaint was made, of the injury which subsequently caused death, namely, a blow on the skull which caused a piece of the bone to impinge on the brain. Another strange incident in this case was that the deceased was sent to the hospital and discharged cured after about five days, the injury to the brain having been unnoticed. A few days afterwards he was again admitted, and died of the injury, which had been previously unremarked.

In this case there could be no doubt that there was a fight between the Madigas and the Malas, when the latter obstructed the procession; but after a man had been seriously wounded, it was attempted to put the responsibility on the merchant, who, during the fight, was lying ill in his bandy.

False evidence through fear.

20. False evidence is as often given or concocted through fear as through enmity or evil motives. The following case tried at the July sessions (1884) at Cuddapah, is a good example:—

Two brothers lived together; they were well-to-do, and their house had been twice robbed. A noted robber, who had several times been convicted, and who was the terror of the neighbourhood, lived in the next village. On a certain occasion one of the brothers went away for two days on business, while the other brother remained at home. During the night he heard some one breaking into the hut where their goods were kept. He went to the door and saw the robber they so much dreaded, leaning down, trying to open the lock of an inner compartment. He rushed in with a stick and struck the man a blow on the head. The robber stooped down to pick up a stick by his side, and the man gave him another blow. At this juncture a neighbour came in and, struck him a third blow. It was then found that the robber was dead. Becoming frightened, the men put

the corpse in a bandy and drove off two miles to the railway, where they placed the body on the line just before the mail train passed. The body was found next morning with the head cut off and the legs broken. The train had passed over the neck and the legs. The remains were sent to the hospital and the skull was found to be fractured in two places, evidently by blows, and the spleen and liver completely ruptured. From the spot where the body was found, up to the prisoner's house, were discovered marks of wheels and a track of blood. Both brothers were accused of murder. One pleaded an *alibi*, which was true, and the other denied all knowledge of the robbery or of the death of deceased. It had been a moonlight night, and almost all the neighbours had turned out at the noise, yet some were found to swear that the brother, who at the time was several miles off, was one of the persons who put the corpse in the bandy. After the prosecution had closed, and before the summing up, the second prisoner, wisely persuaded by his counsel, made a clean breast of it, told how the robbery took place, and that, dreading the known strength and violence of the robber, he had struck him several times, and then fearing the consequences, had driven the body off, helped by a neighbour, to the railway. The second prisoner was acquitted on the ground that he had acted in justifiable defence of property. The first prisoner, who had been absent, was also acquitted. If the prisoners had only told everything at first, they would probably have never been committed.

False evidence the result of ignorance.

21. Another reason for false evidence is ignorance. A witness comes up on behalf of the accused or, it may be, of the prosecutor. He is first examined by the vakeel for his own side. He knows that this vakeel will ask him no embarrassing questions, and answers everything without hesitation. In fact, he probably says a great deal more than he really knows. When the other vakeel gets up, he knows that he is retained on the opposite side, and his questions may therefore be dangerous. Accordingly, he thinks the best thing to do is to answer every question in

the negative, and is not deterred even when the answer is palpably an untruth. He soon gets into difficulties and then has to admit that he has been giving false answers. This, of course, throws suspicion upon the whole of his previous evidence, the principal part of which may have been true.

Remarks on the evidence of the uneducated class of natives.

22. The idea of a witness of the uneducated class of inhabitants, seems to be that he must help the judge to convict or acquit the prisoner, as the case may be. "This or that is what really happened," he thinks, "but if I don't tell the judge he will never find it out." Of course, there are a great many cases in which the evidence is wilfully false, but we believe that in a very large number of cases, where false evidence is given, it is not intentional, and it only requires a little patience and good humour to find out what is true and what is false. In civil cases this is much more difficult, and there is scarcely a civil case that comes before the courts in which there is not wilful perjury and frequently forgery on both sides. These cases generally have to be decided on hard facts and on circumstantial evidence. Good circumstantial evidence is generally supposed to be the best kind of evidence that can be produced, but it is remarkable in this country how frequently circumstances are forged so as to fit in with one another.

False confessions are not uncommon.

23. False confessions are also not uncommon. In Europe it sometimes happens that a man will make a false confession of a crime that is occupying public attention, but it is generally found that the person is of weak intellect. In this country, however, confessions are sometimes made simply because the accused know there is strong suspicion against them, and think that, possibly by confessing, they may get off the extreme penalty. Dr. Chevers mentions several cases of persons who confessed to having murdered men who were still living, and who had never been attacked. This is often ascribed to undue pressure of the police, and there can be no doubt that fear of torture has produced many a false confession. It would be a bold thing to say

that police torture no longer takes place, and Mr. Gribble has frequently had cases before him where confessions had been made which were subsequently withdrawn, and which he could account for in no other way than that undue pressure had been used by some one. The subject of police torture is alluded to further on, and we will not therefore dwell upon it here. It may, however, be as well to allude to the remarkable success which attends the efforts of some of the special dacoity inspectors. One of these officials never brought a case into court without a confession from one or other of the prisoners. There is every reason to believe that the cases brought up were true cases, though whether all the details of the confessions were true is another matter. There can be no doubt that a large number of these confessions were obtained, not by torture but by persuasion. A prisoner is told that if he will make a clean breast of the matter, he will probably get a comparatively slight punishment, and in the meantime his family shall be provided for. The villagers themselves are only too glad to get a dangerous gang run in, and make arrangements for the provision of the family of the man who confesses. The confession once made, leads to other evidence corroborating it, and the gang is broken up. It is, of course, a fact that there are a number of entirely false accusations, but we believe it to be equally a fact that the persons sent up for trial are, generally speaking, the real offenders, though it probably very often occurs that the evidence submitted in support of the accusation is entirely false.

24. Zeal in detection sometimes carries the police a great deal too far, and Chevers quotes a case in which the police, having found an unrecognizable dead body, manufactured a murderer. A man happened to be missing, and the man's concubine was induced to accuse three persons of having murdered him, and identified the corpse as that of the missing man. The man himself however turned up just at the right moment, and the prisoners were acquitted. Sub-

Zeal of police sometimes carried too far.

sequently, three of the police were convicted of having extorted confessions and sentenced to five years' rigorous imprisonment.

Concluding remarks.

25. The foregoing remarks are nothing more than an allusion to this subject. To treat it exhaustively would require a whole volume, but to those who wish to study the subject further, and to read some remarkable cases of false evidence, fabricated charges, and police torture, we would recommend a perusal of Dr. Chevers' work, in which this subject (as, indeed, are all other subjects connected with Indian Medical Jurisprudence) is dealt with in the greatest detail; it is a mine of valuable information.

CHAPTER III.

MODES OF DEATH.

Syncope—Asphyxia—Coma—Tabular view of modes of death—Coma, death beginning at the head—Syncope, death beginning at the heart—Apnœa (asphyxia), death beginning at the lungs—Causes of sudden death—Presumption of death—Presumption of survivorship—Definite rules exist in some contries in regard to survivorship—English law presumes nothing—Exceptional rules in regard to survivorship.

THERE are three modes in which death may take place—by Syncope, Asphyxia, and Coma.

26. Syncope, or arrest of the heart's action, may occur from (*a*) deficiency of blood, due to hæmorrhage, and (*b*) the effects of certain diseases and poisons. The *post-mortem* signs of this mode of death are:—The heart contains the natural amount of blood; there is blood in the veins and arteries; and there is neither engorgement of the brain or lungs.

27. Asphyxia, or apnœa, death occurring as a result of any serious interference with the action of the lungs or the respiratory mechanism. It may be caused by (*a*) certain diseases of the lungs, and (*b*) mechanical obstruction to respiration. The *post-mortem* examination shows distension of the pulmonary artery and its branches, of the right side of

the heart, and of the venæ cavæ;* the left side of the heart and the aorta are comparatively empty.

28. In Coma, death is due to some cerebral or brain mischief, such as may be caused by apoplexy, fracture of the bones of the head, compression of the brain, etc. *Post-mortem* we find congestion of the membranes and substance of the brain and lungs, with more or less blood in the right cavities of the heart. Coma.

29. The following gives in tabular form the various modes of death :— Tabular view of modes of death.

I.—COMA—DEATH BEGINNING AT THE HEAD *or, in the brain* :— Coma—death beginning at the head.

Pressure on the brain or medulla oblongata. (Compression, apoplexy, hydrocephalus† etc.)

Blows on the head causing cerebral disturbance. (Concussion, shock, etc.)

Action of narcotic poisons from their specific action on the brain and nervous system. (Opium, etc.)

Action of certain mineral poisons. (Barium, arsenic, etc.)

Certain discharges and hæmorrhages, which, although incapable of producing syncope, paralyse the nervous centres.

Plugging of an artery supplying the brain by a clot, or by solid material detached from any surface over which the arterial current has flowed.

Certain cases of kidney or liver disease. (Uræmic poisoning, etc.)

II.—SYNCOPE—DEATH BEGINNING AT THE HEART :— Syncope—death beginning at the heart.

(1) *Anæmia—a deficiency in the quantity or alteration of the quality of the blood—*

Injuries to the heart or to the larger blood vessels.

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* The large veins which convey the blood from the body to the heart.

† *Hydrocephalus* is the technical name for the disease popularly called "water on the brain." It is a collection of fluid in the cavities of the brain: frequently the fluid surrounds the brain as well.

Hæmorrhages from lungs, uterus, etc. (Death by depletion.)

Discharges other than blood but which indirectly drain the blood. (Extensive suppuration, etc.)

(2) *Asthenia—a deficiency in the power of the heart or general vital forces—*

Starvation.

Exhausting diseases. (Phthisis, diabetes, dysentery, cancer—especially of the stomach and œsophagus, tumours pressing on the thoracic duct, etc.)

Action of certain poisons.

Certain injuries. (Concussion of the spine. Severe blows on the epigastrium, etc.)

Severe brain lesions.

Apnœa (asphyxia)—death beginning at the lungs.

III.—Apnœa (Asphyxia)—Death beginning at the lungs :—

(1) *Stoppage in the action of the respiratory muscles.* This may result from—

Exhaustion of the muscles. (Debility, cold, etc.)

Loss of nerve power. Injury to the upper part of the spinal cord or division of the pneumogastric* or phrenic† nerve, producing paralysis of the muscles of respiration.

Mechanical pressure on the chest or abdomen.

Tonic spasm. (Tetanus, hydrophobia, etc.)

(2) *Stoppage in the action of the lungs themselves.* This may result from—

Mechanical obstacles. (Entrance of air into chest, through wounds in the thorax, through wounds in the diaphragm, etc.)

Division or compression of the eighth pair of nerves—that is, the pneumogastric.

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* A pair of large nerves which are mainly distributed to the lungs and stomach, but also supply the larynx, pharynx, heart, liver, etc. This nerve is also called the *par vagum.*

† The nerve which supplies the diaphragm or midriff.

(3) *The entrance of pure air into, or the escape of impure air from, the lungs being prevented.*

This may result from—

Foreign bodies in the mouth, nose, larynx, etc.

Submersion.

Suffocation, strangulation, hanging.

Want of air (as in very high altitudes) or want of a sufficient percentage of oxygen, although the diluent gases, such as nitrogen and oxygen, be inert.

Certain irritant gases as SO_2, Cl., etc., which produce spasm of the glottis.*

(4) *The supply of blood to the lungs prevented by the plugging of the pulmonary artery*† *by a blood clot (embolus)*.‡

30. Amongst the causes of sudden death (excluding violence and poison) we may mention§ :— Causes of sudden death.

(1) Disease of the heart (especially fatty degeneration, angina pectoris,|| aortic regurgitation,¶) and diseases of the pericardium.**

(2) Diseases of the blood-vessels, especially aneurism and thrombosis.†† (The forms of aneurism mostly likely to end suddenly are intra-cranial, intra-pericardial, abdominal and pulmonary). Injuries to arteries, such as occasionally occur

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* The *glottis* is the opening at the top of the larynx.

† The *pulmonary artery* is a large vessel which passes from the right side of the heart to the lungs after dividing into two large branches.

‡ TIDY's *Legal Medicine*, p. 282 *et seq.* An *embolus* is a clot of blood brought by the blood current from a distant artery, and forming an obstruction at its place of lodgment.

§ TIDY's *Legal Medicine*, Part I, pp. 279, 280.

|| *Angina pectoris* is sometimes called "neuralgia of the heart."

¶ *Aortic regurgitation* is a disease of the heart caused by the *backward* flow of blood from the aorta into the left ventricle during the diastole of the heart. The *diastole* is the period of rest of the heart.

** The *pericardium* is the fibro-serous covering of the heart—the bag in which the heart is contained.

†† *Thrombosis* is the process by which a thrombus is formed. A *thrombus* is a clot of blood formed at the place of the deposit of an obstruction in the blood vessel.

from angular curvature,* etc., have been known to cause sudden death.

(3) Large effusions of blood in the brain or its membrane—cerebral and meningeal apoplexy.

(4) Pulmonary apoplexy and hæmato-thorax.†

(5) The sudden bursting of visceral abscesses.

(6) Ulcers of the stomach, duodenum,‡ or of other parts of the alimentary canal.

(7) Extra uterine fœtation§, peri-and retro-uterine hæmatoceles,|| apoplexy of the ovary,¶ rupture of the uterus.

(8) Rupture of the urinary bladder or of the gall bladder, or of some other viscus from accidental violence or other cause.

(9) Cholera and certain zymotic diseases** at times kill very rapidly.

(10) Large draughts of cold water taken when heated. (The sudden effects resulting from imbibing large quantities of spirit come under the head of "alcoholic poisoning").

(11) Mental emotion.

(12) The accidental swallowing of foreign bodies, so as to cause blocking of the pharynx and obstruction of the glottis.

Presumption of death.

31. With regard to the presumption of death, Lyon answers the question, When will it be presumed that a person is dead? as follows :—"In India, the law is (*a*) that if

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* *Angular curvature* refers to a bending of the spinal column.

† *Hæmato-thorax* is the emptying of a wounded or ruptured vessel within the cavity of the chest.

‡ The *duodenum* is that part of the small intestine just below the stomach.

§ *Extra-uterine* fœtation, or ectopic gestation, is the development of the ovum outside the normal cavity of the uterus.

|| *Peri-and retro-uterine hæmatoceles* are tumours formed by the extravasation and collection of blood around and behind the womb.

¶ The *ovary* is the organ for the deposit and evolution of the primordial ovule, corresponding to the testicle of the male, and situated one on each side of the womb.

** The term *zymotic* is applied to diseases generally classed as epidemic, endemic, or contageous, and now believed to be due to specific viruses.

a person is proved to have been alive within thirty years, the legal presumption is that he is still alive, except (*b*) it is proved that the person has not been heard of for seven years by those who would naturally have heard of him if he had been alive, in which case the law presumes that he is dead. (Sects. 107 and 108, Indian Evidence Act). The law, however, presumes nothing as to the time of his death, the period of which, if material (as it often must be in cases of succession and inheritance), must be proved by evidence. In either case, the presumption arising may be rebutted by proof, in case (*a*) of the person's death; in case (*b*) of his being still alive. In France, a legal presumption of death arises after thirty-five years of absence, or after one hundred years from date of birth."

Presumption of survivorship.

32. With regard to the question of presumption of survivorship, Lyon states that "when two or more persons die at almost the same time, or by a common accident, the question may arise who survived longest; and if no direct evidence on this point is available, the question becomes one of presumption of survivorship. As an example of the cases in which this question arises:—Suppose A to have left property by will to B, and that A and B die by a common accident, no direct evidence being available as to whether A or B died first. Here the question of presumption of survivorship may arise, because if A died before B, B may be considered to have succeeded to the property left him by A, and B's heirs inherit; while if B died first, A's heirs inherit, seeing that B never succeeded to the property willed to him by A."

Definite rules exist in some countries in regard to survivorship.

33. In some countries definite rules of law exist by which such cases are decided. In France, for example, some of the rules laid down are:—

(1) If all those who perished together were under fifteen, the oldest shall be presumed to be the survivor.

(2) If all were over sixty the youngest shall be presumed the survivor.

(3) If all were between fifteen and sixty, the males shall

be presumed to have been the survivors if the ages were equal, or the difference in age not greater than one year.

(4) In other cases, the youngest shall be presumed to be the survivor.

English law presumes nothing.

34. The English law presumes nothing in cases of this kind, and if, therefore, a person made a claim and had, in order to substantiate it, to prove that A survived B, and had no proof of that fact beyond the assumptions arising from age or sex, he could not succeed.

Exceptional rules in regard to survivorship.

35. It may, however, be pointed out, that in questions of this kind, it is likely that the strongest lived longest. There are, however, certain exceptions, for example :—

" (1) Where a mother and child both die during delivery, if the death of the mother has been caused by hæmorrhage, it is probable that the mother died first.

" (2) If a number of persons die from the effects of excessive heat, it is probable that the adults died first, children and old persons bearing heat better than adults.

" (3) Where the cause of death is drowning, as females are more likely to faint than males, and as the occurrence of syncope delays death by asphyxia, it is possible that females may survive longer than males. If, however, there has been a struggle for life, it is probable that the males, being stronger, survived the females.

" (4) Where the cause of death is starvation, aged persons (if healthy and robust), requiring less food than adults and children, probably live longest."*

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* LYON'S *Medical Jurisprudence for India*, pp. 27 and 28.

CHAPTER IV.

WOUNDS AND INJURIES.

What are wounds—Cause of death—The inquest—Identification of the body—General details to be observed in regard to identity—Special appearances to be noted in case of mutilated remains—Notes in regard to a skeleton or individual bones—Clothes or ornaments may aid in establishing identity—Remarkable cases of identification—Subsequent evidence regarding wounds—Evidence as to whether wounds caused before or after death—Wounds caused after death—Distinguishing features of wounds inflicted before and after death—Suspicion thrown on enemies of deceased's family in cases of natural death—Retracted vessels safest sign of wounds caused during life-time—The *post-mortem* examination—Size and description of wounds to be noted—Has the wound been inflicted before or after death?—Bruises or contused wounds—Difference between a blow caused before and after death—Rule not to be taken as a hard and fast one—Certainty of the rule as regards a blow given after *rigor mortis* has set in—Appearance of wounds inflicted during life—Appearance of wounds inflicted after death—Case of judicial murder of innocent man—Position and course of wound to be described—Rules adopted in Europe regarding period of death not applicable to India—Death where there is no internal or external mark of injury—Death from shock—Death from squeezing of testicles—Death of wounded persons from natural causes mistaken for violence—Death after long periods—By what kind of weapon was the wound caused—Difficulties in regard to fractures greater than in the case of wounds—The rice-pounder a common weapon of assault in the Madras Presidency—Presumption of intention from the weapon and violence used—The Bamboo or *lathi* commonly used in Bengal.

MEDICAL evidence is required principally in cases where injuries have caused death. In cases where the injured person recovers, his own evidence is available, though it may often occur that medical evidence is required in corroboration, or to prove that the wounds have, or have not, been self-inflicted. We will, therefore, first consider cases in which death has occurred. These may be divided into two classes: (1) death caused by wounds, or external injuries; and (2) death caused by hanging, drowning, suffocation, strangulation, throttling, smothering, and starvation.

What are wounds.

36. Under the head *Wounds* fall all those injuries which come within the definition in the Penal Code of hurt and grievous hurt. It depends upon the nature of the hurt caused, the intention of the party causing it, and the result of the hurt, whether the accused is guilty of simple hurt, grievous hurt, attempt to commit murder, or murder itself.*

Cause of death.

37. The cause of death is the first and most important question which arises, and is one about which a doubt arises oftener in this country than in Europe. As already stated, it frequently happens that the apparent cause of death is not the actual cause of death. It is, therefore, of the utmost importance that, as soon as the dead body is discovered, the surrounding circumstances should be most carefully noted. When possible, a corpse should be left untouched in the position in which it has been found, until the arrival of the police; or, if they are too far distant, until it has been inspected by the village authorities.

The inquest.

38. The result of this inspection must be at once reduced to writing, and in this document—called in the Madras Presidency a *mahazarnamah* and in Bengal, *sooruthal,*—every circumstance should be carefully noted. In the mofussil, the village magistrate occupies the position of the coroner, and it very often depends upon the accuracy with which his report is drawn up, and the confidence which can be placed upon it, whether a crime results in detection or not.

Identification of the body.

39. The first point is the identification of the body. In this country, where there are so many wild animals, it is often very difficult to identify human remains as being those of a supposed deceased person. A case occurred in the June sessions at Cuddapah (1883), in which the body of a woman, who had been killed twenty-six hours previously and left in a *vanka* or dry river-bed, was found entirely stripped

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* The old surgical definition of a *wound* makes it consist in a *solution of continuity*. This definition would not include contusions, concussions, bruises, simple fractures, dislocations, and sprains, since the solution of continuity must take place in the skin. These latter are generally termed mechanical injuries, but all these injuries of either kind fall naturally under the head of hurt, as defined in the Penal Code.

of flesh. The body was, however, identified by a missing tooth in the jawbone and by some of the articles of clothing found lying near it. This is, probably, one of the most rapid cases on record in which all traces of flesh have been removed. Generally speaking, from three to four days elapse before all traces disappear, and even after this lapse of time, bodies are sometimes found almost intact. Owing to the scanty clothing which natives wear, it is often exceedingly difficult to identify remains, and it is, therefore, of importance that nothing should be omitted which can bear upon the question of identification. As a matter of fact, many cases have been convicted—and the convictions confirmed by the High Court—in which there has been no identification of the remains; but, as a general rule, in such a case, the sentence is generally not one of death, but of transportation for life. This, however, is not invariably the rule, as will be seen by a reference to Illustrative Cases I and II.

40. The ensuing summary of the details to be generally observed and noted in the examination of persons, or of bodies, or of bones regarding identity may be interesting:— **General details to be observed in regard to identity.**

I.—The following points should be noted under general circumstances:—

(1) The surroundings of the body—

- (*a*) Clothes.
- (*b*) Jewellery.
- (*c*) All articles found on the body or in the coffin.
- (*d*) Hairs grasped in the hand or free about the body.

(2) The probable business or *trade* at which the person worked—

- (*a*) Condition of the hands (horny or soft).
- (*b*) Any special injuries to nails.
- (*c*) Any special stains (such as silver and dye stains).

(3) The height of the person.

(4) The weight of the person.

(5) Age—

(*a*) The amount and colour of the hair.
(*b*) The teeth.
(*c*) The condition of the alveolar processes.
(*d*) The condition of the fontanelles.*
(*e*) The points of ossification.†
(*f*) The condition of the epiphyses.‡
(*g*) The size of the bones.

(6) Sex—

(*a*) The genital organs.
(*b*) The breasts.
(*c*) The general conformation.
(*d*) The length of the back hair, and the nature of the hair generally.
(*e*) Pelvis.§
(*f*) The markings of the bones.

(7) Deformities.—

(*a*) Shortening of legs from disease of hips, etc.
(*b*) Spinal disease.
(*c*) Talipes.||
(*d*) Large wens,¶ etc.

(8) Marks, growths, etc., on the skin. Distinguish between those arising—

(*a*) From disease (such, *e.g.*, as scrofulous ulcers, small-pox, diseased teeth, syphilis, skin disease, etc.)

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* The *fontanelles* are the membranous spaces in the infant's head, from delayed formation of bone in the cranial bones.

† The points or "centres" in which the formation of bone has taken place and the extent to which these centres have developed.

‡ The *epiphyses* are the processes of bone attached by cartilage.

§ The *pelvis* is the cavity formed by the hip bones.

|| *Talipes* is the deformity commonly called "club foot."

¶ *Wens* are small cystic swellings varying in size from a millet seed to an orange, situated in the skin or tissues immediately beneath the skin.

(b) From operations (major operations also bleeding and cupping, leech bites, setons, etc.)
(c) From tatooing or flogging.
(d) From natural causes (discoloration, nævi,* moles, warts).
(e) From violence.
(f) From stains (such as blood, etc.).

(9.) Injuries—
(a) Fractures.
(b) Dislocations.
(c) Wounds. Consider (1) their probable origin; (2) position; and (3) extent, etc.

Examine now in detail the various parts and organs of the body.

(10.) The Head—
(a) Complexion (fair, dark, sallow).
(b) Shape and general type of face and head (European, Mongolian, etc.).
(c) Forehead (low, high, prominent).
(d) Eyes (large or small, sunk or prominent).
(e) Nose (short or long, flat and broad, broad or well formed nostrils, etc.).
(f) Ears (lobules well formed or continuous with the cheeks—pierced or not).
(g) Mouth (large or small; note scars on the roof and the conditions of alveolar processes).
(h) Lips—large or small (cicatrices).
(i) Teeth—
Number.
Regularity.
State of decay.
Any special parts where they are more than usually worn away.

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* A *nœvus* is a mark or blemish due to the dilatation of the blood vessels near the surface of the skin or within its texture.

Whether there are false teeth or indications exist of their having been worn.

(*j*) Chin (full, round, double, pointed, or receding).

(*k*) Hair—

Amount, color, and length of hair on head, lip, chin.

Whether the color be natural (test if necessary).

Whether it has been recently cut.

(11) The Neck—

Its characters (short or long, thin or thick cicatrices).

(12) The Chest—

(*a*) Formation (well formed or pigeon shaped).

(*b*) Shoulders (high or sloping).

(*c*) Sternum or breast-bone (flat or sunk, etc.).

(13) Pelvis—

(*a*) The genitals normal or otherwise.

(*b*) In females the question of pregnancy.

(*c*) In the case of a skeleton, decide whether the pelvis be that of a male or female.

(14) The Extremities—

(*a*) The arms—size and length generally:

The fingers, short or long.

Whether they are of proper proportioned length.

Any peculiarities of the nails.

The hands, rough or not by hard work.

Whether marked or not by stains.

(*b*) The legs—whether uniform or not in length:

Anchylosis* of joints.

Whether bowed or not.

Whether knock-kneed.

The ankles and feet.

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* *Anchylosis* is a stiffness or immobility of joints arising from various causes.

Special appearances to be noted in case of mutilated remains.

II.—In the case of mutilated remains, the following special appearances should be noted in addition to what has already been stated :—

(1) The degree of accuracy with which the parts fit together as follows :—

- (*a*) Bones.
- (*b*) Muscles.
- (*c*) Blood vessels.

(2) Nature of the mutilation :—

- (*a*) Whether the muscles are hacked or have been divided by a sharp knife.
- (*b*) Whether the bones have been chopped or cut with a fine or coarse saw.

(3) The after treatment to which the parts have been subjected :—

- (*a*) Whether they have been acted upon by lime or other chemicals.
- (*b*) Burning—

  If the bones be entire, examine as usual.

  If only an ash be found, examine this for phosphate of lime.
- (*c*) Boiling.

Notes in regard to a skeleton or individual bones.

III.—The following details should be noted in the case of the discovery of a skeleton or of individual bones, in addition to the points already indicated :—

(1) The extent to which the soft parts have disappeared.

(2) The extent to which separation of the bones has taken place.

(3) The colour of the bones.

(4) Their state of preservation.

(5) Are they human or not.

(6) The sex as determined from the pelvis and the characters of the bones generally.

(7) Do the bones belong to one or to more than one body.

(8) Carefully examine the pelvis and the parts around for the remains of fœtal bones.

(9) Examine carefully for any evidence of disease of the bones. (Special diseases—anchylosis, rickets, syphilis, softening, etc.).

(10) Existence of injuries.

Clothes or ornaments may aid in establishing identity.

41. The clothes or ornaments found on a body may aid in establishing its identity. In the case of natives of India, the following points should be specially noted :—

In males :—

(1) If the native coat (*angarka* or *chapkan*) is worn, whether this fastens on the right side (= Hindu), left side (= Mahomedan), or centre (= Parsees, Jews, and some Hindus).

(2) If a sacred thread is worn, whether this passes over the left shoulder and under the left arm-pit (= Hindu), or is worn round the waist (= Parsee).

(3) If a necklace of beads is worn, the material of which they are composed should be noted. If these are of wood, or if the beads are nuts or seeds, the wearer is probably a Hindu.

(4) It may be also noted that unless both ears are pierced, the individual is not a Hindu.

In the case of females it should be noted—

(1) Whether trousers are worn or not—trousers with a sacred thread indicate a Parsee; without, a Mahomedan.

(2) Whether there are bangles on the wrists or not. An adult female without bangles is probably a Hindu widow or a non-Hindu.

(3) Whether the nose ring is passed through a perforation in the septum (= Mahomedan), or through one in the left ala (= Hindu).

(4) Whether the head is shaved or not. A female

with the head shaved is probably a Hindu widow.*

Remarkable cases of identification.

42. In the *Indian Medical Gazette* of 1875, January 1st, several remarkable cases of identification are recorded :—

(*a*) An adult male, *æt.* 45 years. A fracture of the sternum, without any appearance of union, bony or otherwise, and rupture of the intercostal muscles, with extensive extravasations of blood at the seat of fracture, were clearly made out at the *post-mortem* on a body far advanced in decomposition. The appearances indicated violence before death, and moreover that the person did not long survive the injuries inflicted.

(*b*) A comminated fracture of the skull discovered in an exhumed and exceedingly putrid body. Prisoner convicted.

(*c*) A fractured skull, with a penetrating wound of the abdomen, clearly made out in "an enormously bloated and maggot-eaten body."

(*d*) Identity established in a body almost skeletonised, by the remains of a cartilaginous tumour of the neck.

(*e*) Identity determined from mere fragments of what had been a body (æt. 8 years) by the hair on the back of the head and the absence of the left lateral incisor. Prisoner convicted.

In the same paper, at page 5, a case is given where identity was determined from a skull, five ribs, and five vertebræ. The teeth and the peculiar shape of the skull were of importance in connection with identification in this case, that of a boy nine years of age.

Subsequent evidence regarding wounds.

43. After the identification, the different heads enumerated at pages 12 to 14 should be invariably discussed in detail, and it must be remembered that any evidence which may be afterwards brought forward regarding the condition

* From LYON'S *Medical Jurisprudence for India*, 2nd Ed., p. 21.

of the body or the nature of the wounds, is looked upon with great suspicion.

Evidence as to whether wounds caused before or after death.

44. In order to be able to decide whether the death has been caused by wounds, it is necessary that there should be some evidence as to whether the wounds were caused before or after death. This is a question which the medical officer who inspects the body will be best able to decide; but still there are some circumstances which it is absolutely necessary the village authorities should note.

Wounds caused after death.

45. In open wounds caused after death—

(1) bleeding may occur, but it is never very copious;
(2) what does occur is venous, and is of a thin fluid character;
(3) the edges of the wound are loose and close;
(4) there is no coagulation of the blood.

Distinguishing features of wounds inflicted before and after death.

46. The following table gives in general terms the distinguishing features of a wound inflicted before and after death, and contrasts them :—

BEFORE DEATH.	AFTER DEATH.
1. Retraction of the skin.	1. No retraction of skin.
2. Hæmorrhage always arterial.* Edges of the wound injected.	2. Venous hæmorrhage.* Edges of wound not injected.
3. Edges of wound everted.	3. No eversion of the edges except from putrefaction, or in fat people.
4. Blood clots large.	4. Only small clots, if any.

This table is given as a guide, for it should be borne in mind that it is by no means easy to decide whether the wound was inflicted before or after death.

Suspicion thrown on enemies of deceased's family in cases of natural death.

47. Cases have occurred (see Illustrative Case VI) in which persons have died a natural death, but after death wounds have been inflicted, and the body has then been placed so as to throw suspicion on an enemy of the deceased's family. In such a case as this, it would probably be easy to detect whether the wounds had been caused after death; but when death has been caused by one act of violence and other

* *Arterial blood* is bright red, *venous blood* dark red in colour.

wounds are inflicted immediately afterwards, the symptoms given above will often be less marked.

Retracted vessels safest sign of wounds caused during life-time.

48. The retracted nature of the vessels, and of the edges of the wound, is one of the safest signs of the wound having been caused during lifetime. This is a point which a medical man can better decide than a village magistrate, and it should, therefore, be an invariable rule that, however apparent the cause of death may seem to be, wherever it is clear, or wherever there is even a suspicion, that violence of any kind has been used, *the body should be invariably sent to the nearest dispensary or hospital.* This, owing to the establishment of a dispensary in almost every *taluq* of every district, has been of late years made possible. A few years ago, when there was generally only one hospital in a district of several thousand square miles, it was often impossible. Still, however, cases frequently occur in which bodies, where death has clearly been caused by violence, are not sent for medical examination.

The *post-mortem* examination.

49. When the body is examined at the hospital, great care and attention must be bestowed upon all these points. There are definite rules regarding how a *post-mortem* should be conducted, which will be dealt with in a subsequent chapter. The medical officer's duty lies exclusively with the body itself: the stomach and intestines he has nothing to do with; they must be sent to the chemical examiner. The necessity of care and cleanliness in the disposal of the stomach, etc., is pointed out further on, but a case may be here alluded to, quoted by Beck, in which a stomach was negligently laid on some fine white sand. At the subsequent examination particles of this were found, and gave rise to an idea of poison by means of powdered glass. As, however, these particles must necessarily have been found outside the stomach, it is presumed that this idea was soon dispelled.

Size and description of wounds to be noted.

50. If there are wounds on the body, note carefully their size and description and the direction in which they run, having especial regard to any facts which may lead to

forming an opinion as to whether they were caused before or after death.

Has the wound been inflicted before or after death.

51. Hæmorrhage* is generally supposed to be *primâ facie* evidence that life was present when the wound was inflicted. This, however, is not always the case, because hæmorrhage may in some cases be observed in a dead body, as, for instance, in cases of hæmorrhagic apoplexy† and in a few varieties of protracted or malignant fever. In these instances, however, it is of a dark colour, and evidently more fluid and venous than in a natural state. There will also be an absence of coagula or clots of blood. Again, blood sometimes flows from an incision in a dead body and sometimes even from a touch, which no doubt gave rise to the idea of a corpse bleeding if the murderer touched it. Bleeding, therefore, is no proof that the wound from which the blood comes was caused on the living body. "But" (says Beck) "hæmorrhage may be wanting (from the wound), and on dissection the blood is found fluid in the heart and its large vessels—the spinal canal, the lungs, or the brain. Is this to be deemed a proof of violent death? I apprehend not. All that can be said is that fluidity is most common in such cases, as from narcotic poisons, lightning, and the like; but it is also observed in sudden death from ordinary causes, and particularly in apoplexy, and even is occasionally not wanting in the usual forms of disease that come under the examination of the anatomist."

Bruises or contused wounds.

52. The same remarks refer to bruises, and a careful examination is required in order to decide whether they have been caused before or after death. It is a settled point, that, unless caused immediately after death, a blow is not capable of causing ecchymosis. Casper has shown, by a

* *Hæmorrhage* is the bursting forth or flowing of blood from blood vessels, from whatever cause.

† *Apoplexy* is a term applied to a morbid state, in which both sense and motion are suddenly arrested, the patient lying as if asleep, but respiration and heart's action continuing, the breathing is noisy or sterterous and the pupils are generally dilated. Apoplexy is usually due to hæmorrhage into the substance of the brain: it may also be caused by pressure on or within the brain.

number of careful experiments, that, in the same way, the application of fire is not capable of causing on a dead body the appearance of vesicles* caused on a living one. It is, however, of importance to remember that, although blows inflicted shortly after death will imitate contusions caused during life, still they will only imitate *slight* contusions.

Difference between a blow caused before or after death.

53. A severe blow caused after death will only produce the same appearances as a slight contusion caused during life. If, therefore, it is palpable that the blow has been a severe one, and the appearances one would naturally expect from a severe blow are wanting (such as swelling from the extent of the extravasation, a yellow margin round the black mark, effusion of blood into the cellular tissue, and an incorporation of blood with the whole true skin, rendering it black, and increasing in firmness and resistance), there can be no doubt that the blow has been dealt after death, even though there may be ecchymosis.

Rule not to be taken as a hard and fast one.

54. It cannot, however, be taken as a hard and fast rule, that blood after death will not coagulate, for Dr. Christison stated, in his paper on the effects of blows after death, that he has known blood to coagulate firmly eight hours after death, and to have seen blood coagulate as it flowed in a *post-mortem* examination—in one case, twelve hours after, and in another upwards of thirty hours after death.

Certainty of the rule as regards a blow given after *rigor mortis* has set in.

55. But it may be accepted as a certainty, that after the body has become cold, and *rigor mortis* has set in, *i.e.*, about three hours after death, the muscles have acquired rigidity, and that therefore a blow, however severe, would leave none of the traces caused by a blow administered before death.

Appearance of wounds inflicted during life.

56. As a general rule, open wounds, if received before death, are marked by red, bloody, and separated edges, and

* *Vesicles* are small blisters, or bladder-like elevations on the surface of the body.

present a gaping appearance. Blood is also more or less collected in the cellular tissue.*

Appearance of wounds inflicted after death.

57. Wounds inflicted after death are livid and their edges close together, and if there is blood to be found in the wound, it will be of a liquid venous character.

Case of judicial murder of innocent man.

58. As a proof of the care which is required in the conduct of a *post-mortem,* and the terrible results which an omission, or an error of judgment, may entail, see Illustrative Case No. V (of Montbailly), in which the failure to correctly judge certain symptoms led to the judicial murder of an innocent man.

Position and course of wound to be described.

59. The course of a wound and its position is very often of the greatest importance in determining whether the act that caused death was one of murder or of suicide. For instance, it is most improbable that a right-handed person could inflict a suicidal wound which runs from right to left, and, again, homicidal stabs run generally from above downwards. The case of Gardner, already quoted, is a very interesting one on this point, and a somewhat similar case was tried at Cuddapah in the April sessions of 1884 (see Illustrative Case No. VII.)

Rules adopted in Europe regarding period of death not applicable to India.

60. Rules, which experience in Europe has caused to be adopted regarding the period when death occurred, are scarcely applicable to this country, where the different stages a dead body passes through are so much more rapid than they are in a cold climate. It is, however, certain that decomposition sets in much earlier in an injured than in an uninjured body, and commences first in the injured portions. The result of this is that the injuries appear to be of a much more aggravated form than they ought to be considered by a medical jurist (Taylor).

Death where there is no internal or external mark of injury.

61. Where death has occurred, and there is no external mark of injury, the opinion of the medical officer should

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* *Cellular tissue* is a white fibrous tissue arranged in the form of little cells, areobæ, or in a meshwork, and diffused generally throughout the body. It fills up the spaces between the different organs and tissues and forms part of most of them. Chemically, this tissue consists chiefly of *gelatine.*

be expressed only after most careful examination of all the parts. There are numberless recorded cases in which, after a quarrel or a struggle, sudden death has taken place owing to the rupture of some internal vessel or organ, brought on by excitement or sudden passion. When the cause of death cannot positively be ascribed to any injury, external or internal, or to any disease, the stomach and intestines should invariably be forwarded to the chemical examiner; but even when no cause of death can be discovered in the *post-mortem,* nor any trace of poison in the stomach, it may happen that death has been caused by violent means.

62. Accordingly, death may be caused by a shock* to the nervous system by means of violence, which, however, may leave no trace, either external or internal. This is often the case where there has been a blow on the upper part of the abdomen, or on the pit of the stomach; and "it is admitted by experienced surgeons that a person may die from so simple a cause without any mark of a bruise externally, or physical injury internally, to account for death. On the skin there may be some abrasion or slight discoloration; but, as it has been elsewhere stated, these are neither constant nor necessary accompaniments of a blow." (Taylor.) In cases of this kind there may be other evidence to show that violence was used and was the cause of death. Death from shock.

Thus, a trial took place at the Liverpool Autumn Assizes, 1837, wherein several persons were charged with the manslaughter of the deceased, by kicking him behind the right ear. The medical witness deposed that there was in this spot the mark of a severe contusion, but there was no injury whatever to the brain, and the body was otherwise healthy. He very properly ascribed death to the violent shock* given to the nervous system, and the court held that the cause of death was satisfactorily made out. The person who inflicted the injury was convicted.

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* The term *shock* is used by medical men to denote the condition of grave vital depression, produced by severe injuries, occasionally after surgical operations or as the result of strong emotions.

Death from squeezing of testicles.

63. Another kind of injury common in this country, which is calculated to cause death by shock, is the squeezing of the testicles. This, however, is generally accompanied by other injuries, and is alluded to under the head *Suffocation.* Where there are many wounds or marks of injuries, it is not necessary to prove that any one in particular was sufficient to cause death; for the shock to the system caused by a number of blows, not one of which would in itself be fatal, has often been proved to be sufficient to cause death.*

Death of wounded persons from natural causes mistaken for violence.

64. Dr. Taylor's remarks on this head are of such importance, and especially in India, where, in the majority of cases, prisoners are undefended by counsel, that they are given *in extenso* : "It is by no means unusual for individuals who have received a wound, or sustained some personal injury, to die from latent natural causes; and as in the minds of non-professional persons, death may appear to be a direct result of the injury, the case can only be cleared up by the assistance of a medical practitioner. Such a coincidence has been witnessed in many cases of attempted suicide. A man has inflicted a severe wound on himself while labouring under disease, or some morbid change tending to destroy life has occurred subsequently to the infliction of a wound, and death has followed. Without a careful examination of the body, it is impossible to refer death to the real cause. The importance of an accurate discrimination in a case in which wounds or personal injuries have been caused by another, must be obvious on the least reflection. A hasty opinion may involve the accused in a charge of manslaughter; and although a barrister might be able to show on the trial that death was properly attributable, not to the wound, but to co-existing disease, yet it must be remembered, that the evidence of a surgeon before a coroner or magistrate, in remote parts of this country (England), may be the means of causing the person

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* See Taylor, Vol. I, page 666. Refer also Reg. *v.* Jones, Warnick, 1831; Reg. *v.* Sayers, C. C. C. Aug., 1841; Reg. *v.* Laws, Norwich Lent, 1854.

charged to be imprisoned for some months previously to the trial. In a case reported by Dr. Berncastle, the deceased, a boy, died from an internal strangulation of the intestine from morbid causes after wrestling with another boy, who might, but for a careful inspection of the body, have been erroneously charged with having caused his death."

65. On the other hand, death may often occur from wounds after long periods, and the wounds may be the actual cause of death, though, perhaps, some other act of violence may be the apparent cause. Thus, a case is related by Sir A. Cooper of a gentleman who died of an injury to the head received about two years previously. Taylor says that the longest interval at which a conviction has taken place from indirectly fatal causes is nine months. (Under this head see Illustrative Case No. IX.) Death after long periods.

66. This is a question that is always asked in court, but is one which it is not always possible to answer. It is, of course, easy to say that an incised or clean cut wound has been caused by a sharp-cutting instrument, a punctured* wound by a pointed one, and a contused wound† or a fracture by a blunt weapon; but when the question goes further and it is asked whether a particular weapon caused a particular wound, the answer can seldom be given with certainty. In this respect, it is necessary to remember that, owing to the contracting power of the skin and of the flesh, an incised or punctured wound, such as a stab, will always appear to be smaller than the instrument by which it has been inflicted. In the case of a cut (as, for instance, throat-cut) or a slash with a sword or bill-hook, the size of the wound depends to a great extent upon the amount of force used, and a small knife may inflict as large a wound as a big By what kind of weapon was the wound caused.

* *Punctured wounds* are those produced by long, narrow, and sharp-pointed bodies, penetrating into the flesh. As examples, we have wounds produced by treading on a splinter of wood or a nail, or the wound produced by the stab of a stiletto.

† *Contused wounds* or bruises are those produced by blows with blunt weapons. There is no solution of continuity or breach of the surface.

sword; but it often happens that the wound itself will afford evidence as to what weapon could *not* have been used. If the weapon produced is a sharp knife, and the edges of the wound are jagged, torn, and lacerated, it can be safely inferred that the wound was not caused by the knife, and the reverse is equally true. If the weapon is blunt with notches, and the edges of the wound are clean and show none of the signs which are to be found in wounds caused by a blunt instrument, it is clear that some sharp weapon has been used. When, however, the appearance of the wound corresponds with the weapon produced, all that can be said is, that the wound *might* have been caused by such a weapon. It is in the power of a professional witness to declare positively that the wound could *not* possibly have been caused by the weapon shown to him, but it is not in his power to state positively that the weapon shown him *did* cause the wound.

Difficulties in regard to fractures greater than in the case of wounds.

67. As regards fractures, the difficulty is even still greater. Bones vary in strength in different persons. The bones of some persons are so exceedingly brittle that they are capable of being fractured by a very small blow from a very light stick. The same refers to the skull, which, with some persons, is much thicker than with others.

The rice-pounder, a common weapon of assault in the Madras Presidency.

68. A very common weapon, which is in the Madras Presidency used in sudden assaults and quarrels, especially between men and women, is the rice-pounder. It is very strange, but Dr. Norman Chevers makes no mention of wounds caused by this deadly weapon, and we can, therefore, only suppose that in the north they are of rare occurrence. The rice-pounder is generally made of hard wood; is about three and a half feet long and about one and a half to two inches in diameter; and at one end it is shod with a thin but strong iron plate, about an inch or an inch and a half in length. A strong blow from a weapon of this kind is almost certain death; and if, as is generally the case, it falls upon the head, a terrific fracture of the skull is the result. It often occurs, however, that the assailant is not

content with inflicting one blow, but strikes two or three, sometimes dashing out the brains of his victim and fracturing the skull to pieces. In some cases, a single blow from a weapon of this kind will produce a clean cut in the skull difficult to be distinguished from a sword-cut. Murders with a rice-pounder are generally the result of a quarrel, in which one or both the parties concerned have made use of the foul terms of abuse which are so common amongst the lower classes in India, and, as far as we can judge from my own experience, and from a perusal of the printed reports of the Foujdaree Udalut and High Courts, are most common in the so-called Ceded districts,—Bellary, Kurnool, and Cuddapah,—though they also occur occasionally in the other districts.

Presumption of intention from the weapon and violence used.

69. Where death has been caused by one or a number of blows, a description of the wounds is of importance as likely to throw light upon the amount of violence used, and therefore upon the intention of the offender. As has been said before, death from a rice-pounder is often the result of a sudden quarrel, but the weapon itself is of so imminently deadly a nature, that it must be in the knowledge of any person of ordinary understanding that a blow from such a weapon is likely to cause death, so that unless grave provocation can be shown, the offender is generally found guilty of murder; it is, however, usual in such cases for the judge to recommend a mitigation of punishment. Thus, in the February sessions, 1884, at Cuddapah, a man was convicted of causing the death of a woman in this manner. The prisoner was quarrelling with and beating his wife, when the deceased, his aunt, interfered and expostulated with him. The prisoner seized a rice-pounder, struck the deceased three times on the head and thrice on the body. The head was smashed to pieces, and a part of the brain protruded. Death after the first blow appears to have been instantaneous. The judge found the prisoner guilty of murder and passed sentence of transportation for life; but, at the same time, recommended to the High Court a miti-

gation. This sentence was confirmed on appeal, and a reduction to five years' rigorous imprisonment was applied for.

The bamboo or *lathi* commonly used in Bengal.

70. In Bengal, the weapon with which fractures are most commonly caused appears (according to Dr. Chevers) to be the *lathi*—a long thin bamboo, used by most natives in walking, and frequently furnished at one end with a small iron ferrule. A weapon of this kind is also calculated to inflict a severe wound, especially upon the head; but the use of it is not so imminently dangerous to life as is that of a rice-pounder, and the intention of the offender will, therefore, be best shown by the amount of violence used. It should, however, be remembered that, when once the passion of a native is aroused, so far as to strike a blow, he seems to be often seized with a kind of frenzy for blood, and goes on striking long after his victim is dead. When in this state of passion he is probably incapable of judging of the consequence of his acts, and it will be a matter for evidence whether this passion has been excited by grave and sufficient provocation.

Causing death in self-defence.

71. The privilege of causing death in the exercise of the right of private defence, continues only as long as the danger to person or to property exists. Any violence used, after such danger, and with it the right of defence has ceased, is a criminal act. Thus, if a man is attacked by a thief or a robber, and he disables him with one blow without killing him, the danger to him has ceased, and he would not be justified in inflicting a series of other blows; and if, by so doing, he caused death, he would be legally responsible. In a case of this kind, however, this blood frenzy which is so often excited, would probably be taken into account in awarding the punishment. For a somewhat interesting and novel case of this kind, see Illustrative Case No. X, and see also case reported at page 18.

ILLUSTRATIVE CASES.

CASE No. I.—NON-IDENTIFICATION OF REMAINS.

Reg. *v.* Sundanem.

DECEASED was induced by two others to leave his village under the pretext of looking for stolen cattle. On the way he was murdered. On the fourth day the remains were found—"his skull in three or four places, grey hairs, a pair of shoes, and a bag with flint and steel. The jackals, vultures, etc., had nearly picked the bones clean."

There was circumstantial evidence, and the sentence was—*death* to first prisoner; transportation for life to second.—*(Madras Reports of Foujdaree Udalut,* 1859.*)* Madura, May to June, 1859.

CASE No. II.—NON-IDENTIFICATION OF REMAINS.

Reg. *v.* Mahabalaya.

DECEASED was a Brahmin, who had been sent to cash a *hoondee* (or cheque). This was on a Friday. He did not return, and on the following Wednesday the remains of a man, with a Brahminical thread, were found. "The witnesses could not identify the body, as the features were entirely decomposed." Some cloths near the body were identified, and certain persons who had been last seen with deceased were, on the strength of circumstantial evidence, convicted.

The sessions judge recommended transportation for life, because the body had not been clearly identified, but the High Court (Foujdaree Udalut) seeing no reason to doubt that the remains were those of the missing man, sentenced to *death.—(Madras Reports of Foujdaree Udalut,* 1859.*)* Honore, June 1859.

CASE No. III.—CAUSE OF DEATH DOUBTFUL.

Reg. *v.* Munisami Chetty.

IN this case the prisoner was the brother of the deceased, and was charged with having killed him by stabbing him in the eye with a style. An eye-witness spoke to having seen the prisoner stab the deceased in the left eye with a style, and, on interfering, to have received a stab in the breast. Other witnesses spoke to having seen blood issuing from the eye after death. Death followed very rapidly. The body was examined in the hospital two days afterwards. One dresser or hospital assistant said that the body was so swollen that he could not discover any wounds; he opened the left eye and temple, *but without any results*. Another dresser stated that he saw "a small wound in the corner of the left eye, which he believes to have been the result of a puncture by a needle." The *zillah* surgeon examined the skull eighteen days after death, and found nothing unnatural about the osseous structure of the orbital cavity, but admitted that there was a fissure through which the style might have been forced to the brain

through the eye-ball, but could not speak with certainty owing to the advanced stage of decomposition.

Verdict.—Guilty of causing death in the manner described.

Sentence.—Three years' imprisonment with hard labour.

In this case it is difficult to understand how a stab of such violence, as to cause almost instantaneous death, could have left such very faint traces. There were, two days after death, when decomposition could scarcely have set in, no other marks of injury on the body. In this case a description of the wound by the village authorities should have been made. The examination by the dressers seems to have been scarcely satisfactory.—*(Madras Reports of Foujdaree Udalut*, 1861.*)* Chittoor, August 1861.

CASE NO. IV.—CAUSE OF DEATH PRESUMED.—(DEATH FROM SHOCK.)

Reg. *v.* Kolorkandiyilo Ramotti.

IN this case, it was alleged, on the one hand, that the deceased had died of cholera, and, on the other, from the effects of a beating he had received the evening before. No *post-mortem* was made; several witnesses proved the beating, and others, whose statements contained contradictions, spoke to vomiting and purging. The judge (Mr. Holloway) remarked :—"I am satisfied with the assessors, that, after this beating, the deceased, a man in good health, lay down greatly enfeebled; that he never recovered from its effects, and that he died of this beating early next morning." The judge disbelieved the evidence regarding the cholera, and, quoting Dr. Taylor, presumed that death followed from exhaustion and a shock to the nervous system. The body appears to have been quickly buried with the knowledge of the village authorities, who are supposed to have connived in representing the death as from cholera.

In the case above quoted, the accused were found guilty of having caused the death of the deceased by beating, and were sentenced to three, five, and one year's imprisonment, respectively. The sentence was confirmed by the High Court.

A proper inquest and mahazarnamah drawn up by the village authorities would clearly have been more satisfactory.

As bearing upon this, a case may be quoted which occurred within Mr. Gribble's experience. During the famine of 1876-77, the officer in charge of the relief camp at Madanapally, paid the camp a visit at night in order to see whether everything was in order. The camp was composed of straw and thatch huts, and the orders were that no lights should be allowed anywhere, except in the kitchen, which was built of brick. One of the warders was found asleep with a light in his hut—a lean-to—which he had thrust under the straw of the roof from which the flame was an inch or two distant. The officer pulled the man out, gave him a sound beating on the posterior with his hunting thong, and turned him out of the camp. On his way to the town, which was about two miles distant, the man was seized with cholera, and died of this disease early next morning in hospital.—Tellicherry, September 1861.

Case No. V.—Cause of death mistaken.

A widow named Montbailly, of inebriated habits, was found dead in her room, lying on a trunk with sharp edges. Thirty-two hours after death the body was inspected by a physician and surgeon, who reported that they found ecchymosis and contusions on the arms, thorax, and particularly over the third, fourth, and fifth ribs. The neck and upper part of the breast were also ecchymosed. The head was swelled, blood was extravasated under the skin of the face, and the nose was filled with clotted blood. On the eyelid there was a wound of nine or ten lines in extent, which penetrated to the orbit, and which might have been caused by a sharp or cutting instrument, but could not, in their opinion, have produced sudden death. It was reported that the wounds might have been caused either by severe blows or by a fall. A physician, who was present at the *post-mortem*, but who took no part in it, gave evidence that the eye was ecchymosed, and that the edges of the wound were irregular and indented.

This evidence, together with proof of frequent quarrels between deceased and her son and daughter-in-law, who lived in the same house, led to the conviction of the latter. The son was broken on the wheel, but the daughter-in-law, owing to pregnancy, obtained a respite. During the interval, the celebrated Dr. Louis was consulted, and the result of his investigation was, that there was no proof of the commission of murder, but rather of death from apoplexy, or some other cause. The following were amongst his reasons for this opinion: Intemperance predisposes to sanguineous* apoplexy, and the head of the deceased should have been opened in order that the condition of the internal parts could have explained the cause of the hæmorrhage. A person in a state of intoxication, and, therefore, predisposed to apoplexy, would, on falling against any sharp-edged substance, naturally lose a considerable quantity of blood, and also have the arteries and veins of the head much distended. It was held impossible that hæmorrhage from the wound in the eye could have caused death. As to the ecchymosis, or livid spots on the thorax and arms which were attributed to blows or a fall, M. Louis observed that *they were the ordinary appearances found on those who die in a state of intoxication.* The result of this further medical evidence was that the former decision was revoked, and the memory of the executed son was exonerated two years after his execution (1772).—*Case quoted by Beck.*

Case No. VI.—Mutilation of bodies after death.

Dr. Norman Chevers quotes several cases of this kind. This mutilation is caused either to prevent identification, as in the case of a wounded thief decapitated by the other members of his gang, or else to throw suspicion upon innocent persons. There are many instances of the former. That given by Herodotus, of a thief caught in a trap whilst plundering the king's treasury, and who begged his brother, who accompanied him, to cut off his head, is probably the oldest on record. Similar cases have occurred in Bengal, and are quoted by Dr. Chevers, *ex. gra:* In August 1869, the papers reported a daring dacoity in the village of Hasalong, in Lohardugga. The

* Or *hæmorrhagic* apoplexy.

robbers were chased by the zemindar and a fight ensued, in which two of the gang were badly wounded. Their comrades, however, succeeded in cutting off and carrying away their heads, so as to prevent identification.

REGARDING mutilation of dead bodies, in order to throw suspicion on innocent persons, there are also several recorded instances. "Ill-will having for some months existed between a ticcadar of Patna and his ryots, the latter resolved to bring him into trouble. With this view they murdered Chumma Gowalah, an unfortunate cripple, and then laid his death at the door of the ticcadar. Ten persons were tried, of whom two were hanged." —(*Chevers.*)

IN the Nizamut Udalut Reports for Bengal, Vol. VI, 1856, a similar case is reported from Tirhoot. The body of a deaf and dumb beggar was found fearfully hacked and cut, leaning against the house of a person against whom the accused had a grudge. Four persons were convicted by the judge, but were acquitted by the higher court. In a copy of Dr. Chevers' book,* the following MS. footnote with reference to this subject was found: "I remember in a case tried by the sessions court of Cuddapah (*circa* 69 or 70), where the defence was that deceased had been murdered to get the prisoners into trouble, the judge (Mr. Hutchins) disbelieved that anything so unnatural could have taken place, and severely reprimanded prisoner's counsel for adopting this line of defence."

A SIMILAR case occurred in Trichinopoly about twenty-five years ago, of which we are unable to find the record. In that case an old man induced his sons to kill him (telling them that he must anyway die soon), and place his body in such a place as to cast suspicion on a relative with whom the family was at enmity. This was done and the trick very nearly proved successful, the relative being put upon his trial and narrowly escaping conviction. He was, however, acquitted, and the guilty parties detected.

"PROBABLY the most atrocious case of the kind on record is that of a woman in the Patna District, who poisoned *her own* little daughter, and having concealed her body on the premises of a neighbour with whom she was at enmity, accused him of having murdered her."—(*Chevers.*)

AGAIN: "It is a well known practice in India, where a death occurs suddenly from natural causes to a member of one or two rival houses, for his relatives to inflict various wounds upon the corpse and to place it in a spot, where it may be readily discovered, near their enemy's dwelling."—(*Ibid.*)

CASE NO. VII.—NATURE OF WOUNDS A TEST OF WHETHER THE CASE IS ONE OF SUICIDE OR MURDER.

THE following case was tried at the April sessions of the Cuddapah court (1884). Hearing a noise in his neighbour's backyard, early one morning, before dawn, the person hearing it went and awoke the inmates. On going to the backyard, the form of a person was seen leaving it, and on going a little further, a female servant of the house was found lying in a pool of blood with her throat cut. No weapon of any kind could be found near the body. The woman was sensible, but could not speak. On the prisoner, a

* *Medical Jurisprudence in India.*

servant of the same house, who slept in the backyard, being arrested and placed amongst others, she pointed him out as the person who had stabbed her. Prisoner's defence was, that the woman had asked him to elope with her, and, on his refusal, had cut her own throat. The woman was taken to the hospital and lived for several days. The wounds were described by the medical officer as being from right to left. There were two gashes, and in each the deepest part was to the right and the gash tailed off to the left. The woman was right-handed.

Held.—That this could not be a case of suicide, as a right-handed person would most improbably have used the left hand; would still more improbably have been able to inflict two gashes with the left hand, and if she had done so, some weapon must have been found near the body.

Sentence.—Death, which was confirmed by the High Court.

Case No. VIII.—Cases where the real cause of death was different from the apparent one.

In March 1867, a woman, *œtat* 73, was charged with causing the death of a pauper, by striking her on the cheek. The deceased became insensible and died in ten minutes. On inspection, it was found that death had been caused by the rupture of an aneurism* of the aorta.† The medical opinion was that the blow might have accelerated a fatal result of the disease.—(*Taylor.*)

In another case (Reg. *v.* Champlonier, 1854), an old man passing on the road was struck on the forehead by a stone thrown by the prisoner. There was a contused wound and the nose bled profusely. The bleeding was arrested, and on the following day the man was considered out of danger. At a later period of the day, however, the deceased was seized with an apoplectic fit, from which he did not recover. The appearance of the brain was sufficient to account for death, but the medical man could not undertake to say that the injury by the stone had in any way produced these appearances. The prisoner was acquitted.—(*Ibid.*)

Dr. Chevers mentions many cases in which persons, who have first of all been killed, have afterwards been hung up so as to cause an impression that they had committed suicide; and a case only lately occurred in which the body of a man found hanging was, on dissection, proved to contain a large quantity of arsenic, thus rendering it probable that he had been poisoned before being hung up.

Case No. IX.—Death after long periods.‡

It is generally believed that wounds of the heart produce almost instantaneous death. Various causes, however, may exist which prevent such

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* An *aneurism* is a tumour swelling, or dilatation of an artery, the contents of the swelling consisting of blood.

† The *aorta* is the great artery springing from the left side of the heart. All the other arteries of the body, except the pulmonary artery, proceed mediatel or indirectly from the aorta.

‡ See also Taylor, Vol. I, 647. Reg. *v.* Sullivan, C. C. C., September, 1853.

wounds from proving fatal for hours and days, and sometimes even for weeks.

Dr. Taylor mentions that out of twenty-nine instances of penetrating wounds of the heart, only two proved fatal within forty-eight hours. In the others death took place at the varying periods of from four to twenty-eight days.

Dr. Chevers quotes the case narrated by Mr. William White of Rangoon. "A soldier was wounded in the storming of the Great Pagoda on 14th April, 1852. The ball entered a little above the anterior fold of the left axilla, taking an oblique direction to the cavity of the chest. At first he appeared to be doing well, and the wound closed. Subsequently, his health declined with feverish symptoms and evidence of pulmonary disease. A few days before his death it was noticed that the action of the heart was weak but natural, its systole or contraction and diastole or relaxation regular and equal. He died worn out and emaciated on the 24th June. On examination, the bullet was found in the left ventricle of the heart, in its most interior part.

A rather peculiar case occurred at Calicut in 1857. Deceased was assaulted by the prisoner armed with a toddy knife, and terrible gashes were inflicted upon the head, neck, etc. This was on 8th April. Deceased was removed to the hospital, and there he died on the 21st May—*not* of the wounds, *but of dysentery*. The apothecary deposed that "dysentery was the sole cause of death, but I am of opinion that he would have died from the number of wounds received and the necessary enfeebling of his constitution in consequence." The prisoner was convicted of wounding with intent to murder, and sentenced to imprisonment for life with hard labour.—*(Reports of Madras Foujdaree Udalut, Vol. VII.)*

Case No. X.—Death caused under a false plea of private defence.

The prisoner appears in the middle of the night to have raised an alarm that some one was breaking into one of the houses. He at once went to the house, and, seeing a person creeping out of a hole in the wall, he attacked him with a bill-hook and almost cut him to pieces. He alleged, in his defence, that he had done this because he considered the man to be a robber. He had at one time been employed as a watchman in the village, but at the time of the occurrence was no longer so employed. It was proved at the trial that the prisoner and the deceased were two thieves. A dispute had occurred between them; the quarrel had been patched up, and the prisoner induced the deceased to join him in the very offence at which the crime occurred. When the deceased had got inside the house, the prisoner raised the alarm, and then, as the deceased crept out of the hole in the wall, at once attacked him in so savage a manner that death must have been instantaneous. Prisoner was found guilty of murder and sentenced to death; but, on appeal, this sentence was reduced by the High Court to transportation for life. This case was tried at Cuddapah in the July sessions of 1883.

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CHAPTER V.

ON RESPONSIBILITY FOR DEATH.

What is a mortal wound—Difference between the law in India and England—What is sufficient to constitute murder—Recorded cases of death from slight injuries——Responsibility of aggressor for consequences of an injury—Death arising from unskilful treatment of wound—Cases quoted of unskilful treatment—Cases in which death results from neglect of slight wound—Failure of injured person to call in medical aid does not exonerate accused—Effects of an unauthorised assault—Wound or hurt which hastens death in a person already diseased—Secondary causes of death—Patient dies from suffocation in case of cut throat—Difficulty in deciding responsibility of person when death due indirectly to injury caused by him—Difference between law in England and in India—Weapon used effects definition of murder—Tetanus—Caution necessary in forming opinion whether Tetanus caused by wound—Erysipelas—Delirium tremens—Death from surgical operations.

AMONGST medical jurists there exists considerable diversity of opinion as to what constitutes a mortal wound.

What is a mortal wound.

72. As far as we in India are concerned, there seems to be little necessity for entering into the controversy, and probably the safest thing to do will be to call those wounds mortal which actually cause death. For the English jurist, the point would seem to be of interest only in order to decide whether or not an accused can be admitted to bail. For instance, in the case of the *King* v. *Salisbury* (1st Strange's Reports, p. 547), a woman, accused of having stabbed a gentleman, applied that a physician of her own nomination should be present at the dressing of the wound in order to be able to satisfy the court that the patient was out of danger, so that she might be bailed. Here, in India, the main gist of murder and culpable homicide is the intention of the offender. If a wound causes death, and was inflicted under such circumstances, or by such a weapon, as was likely to cause death, the offence will be murder or culpable homicide.

Difference between the law in India and England.

73. In England the law would seem to be different, and, according to Lord Hale, "if a man be wounded and the wound, although not in itself mortal, turn to gangrene* or fever, this is homicide in the aggressor; for though the fever or gangrene be the immediate cause of death, yet the wound, being the cause of the gangrene or fever, is held the cause of death—*causa causati.*"

What is sufficient to constitute murder.

74. Lord Hale says, "It is sufficient to constitute murder that the party dies of the wound given by the prisoner, although the wound was not originally mortal but became so in consequence of negligence or unskilful treatment."

Recorded cases of death from slight injuries.

75. There are instances on record of persons who have died in consequence of very slight injuries: for instance, a girl struck her leg against a wheelbarrow, a slight wound on the shin was produced, but constitutional symptoms set in, and she died of the ultimate effects of the wound a few days afterwards. Had this injury been caused by another, he would, under the English law, as laid down by Lord Hale, have been guilty of homicide, but in India he would not be found guilty of murder or culpable homicide. *Per contra*, if a person were to fire a pistol into a crowd, or, in striking at a man with a sword, were to inflict even a slight skin wound, and the wound were afterwards to mortify and cause death, he would be liable for murder, because the act in itself was so imminently dangerous to human life that he would be held liable for all the consequences of the act.

Responsibility of aggressor for consequences of an injury.

76. Here also Lord Hale's rule would apply, and if the wound caused death owing to the want of medical treatment, or even if it could be proved that the wound might not have proved mortal if treated better or differently, he would still be liable.

Death arising from unskilful treatment of wound.

77. "But," says Lord Hale, "it is otherwise where death arises not from the wound, but from unskilful appli-

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* *Gangrene* is the mortification or death of a part of the body from failure in nutrition.

cations or operations used for the purpose of curing it." This distinction, it will be observed, is a very nice one, and Dr. Taylor remarks : "In slight and unimportant wounds it might not be difficult to distinguish the effects resulting from bad treatment, from those connected with the wound, but there can be few cases of severe injury to the person, wherein a distinction of this nature could be safely made, and the probability is that no conviction for murder would now take place if the medical evidence showed that the injury was not originally mortal but only became so by unskilful or improper treatment." (See Illustrative Case No. XI.)

78. In works on Medical Jurisprudence several cases of unskilful treatmnet are given in illustration, of which we may quote the two following :— Cases quoted of unskilful treatment.

In the case of *MacEwan*, Perth, September, *circ.* 1830, the prisoner was indicted for the manslaughter of a boy, by striking him a blow on the shoulder, which dislocated the shoulder joint. Two days after the blow, an ignorant bone-setter was consulted, and, owing to his manipulations, inflammation took place, and the boy being of a scrofulous* habit, this proved fatal. In another case (*Reg.* v. *Kingshott*—Lewes Summer Assizes, 1858), a man in a quarrel received a bite on his thumb. He went to a quack, who applied some irritating ointment, which led to severe inflammation, and this rendered amputation necessary, from the effects of which he died. There was evidence that the original injury was slight, and would probably have healed but for the improper applications. In both these cases the prisoners were acquitted. In this country, in the former case, the prisoner would certainly have been liable to punishment for causing grievous hurt, and probably for simple hurt in the latter case.

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* The word *scrofulous* is the adjectival form of scrofula, which is a morbid condition, usually constitutional and frequently hereditary, characterised by the formation of glandular tumours in the neck and other parts, these tumours having a tendency to suppurate (or form pus) slowly, leaving chronic ulcers which heal with difficulty. It is prone to attack bones and internal organs, and frequently leads to pulmonary phthisis or "consumption."

Cases in which death results from neglect of slight wound.

79. In India, it is frequently impossible for a native to get any medical assistance whatsoever, and there might occur many cases in which, owing to a slight wound not having been treated, inflammation and death might supervene. In all such cases the test would probably be—Under what circumstances, and with what kind of weapon, was the injury caused?

Failure of injured person to call in medical aid does not exonerate accused.

80. The mere failure of the injured person to call in medical assistance would not be sufficient to exonerate the accused; for, in the case of *Governor Wall*, the Lord Chief Baron, in charging the jury, observed that no man was authorized to place another in so perilous a predicament as to make the preservation of his life depend merely on his own prudence. The same has been ruled in another case (*Bennett* v. *Gredley*, Exchequer Sittings, Hilary Term, 1854), where there was a suit for compensation by reason of injuries inflicted on a boy's arm. It was argued in defence that the state of the arm was partly owing to a former injury, but the Chief Baron remarked that a man was not bound to have his body in so sound and healthy a state as to warrant an unauthorized assault upon him.

Effects of an unauthorised assault.

81. A man, therefore, who commits an unauthorized assault upon his fellow-man, must take the chance of the effects such an assault may produce. "So, if the person mal-treated be an infant or an infirm old man, or one labouring under a mortal disease, it is notorious that a comparatively slight degree of violence will destroy life in these cases, and the prisoner would be properly held responsible. A wound which *accelerates* death, *causes* death, and may therefore render the aggressor responsible for murder or manslaughter, according to the circumstances" (Taylor).

Wound or hurt which hastens death in a person already diseased.

82. According to Lord Hale, if a man has a disease which, in all likelihood, would terminate his life in a short time, *and another gives him a wound or hurt which hastens his death*, this is such a killing as constitutes murder. This point is of especial interest in India, where so many persons suffer under an enlarged spleen, which is liable to

rupture on the infliction of a very slight blow. As stated above, the test would probably be the circumstances under which the blow which caused the injury was struck. It would probably be held that a kick, or blow with a stick, is an act so imminently dangerous that the aggressor would be guilty of having caused the death, if death—say by the rupture of the spleen—actually did occur. A blow with the clenched fist might likewise be held to be dangerous in itself, but this could scarcely be the case in the event of a blow struck with the open hand. In connection with this, a very nice point would arise. Supposing such a blow from a kick, or a stick,—which would not, under ordinary circumstances, cause death,—caused a rupture, say, of the spleen, from which the person injured subsequently *recovered*, could the aggressor, who, in the event of death having ensued, might have been held liable or culpable homicide or murder, be held liable for *an attempt* to commit these offences? It is, perhaps, doubtful whether any Court would so hold him liable.

Secondary causes of death.

83. A person who recovers from the immediate effects of a wound may die from fever, inflammation or its consequences, pyæmia,* erysipelas,† delirium tremens, tetanus‡ or gangrene,§ or from an operation rendered necessary in the treatment of the wound. These are what may be called secondary causes of death, or secondary consequences of a wound (Taylor).

Patient dies from suffocation in case of cut throat.

84. It frequently happens that in the case of cut throat, the patient dies from suffocation. In Illustrative Case No. VII, already quoted, where a woman's throat was cut, she died about ten days afterwards of inflammation of the lungs, brought on by the wound.

Difficulty in deciding responsibility of person when death due indirectly to injury caused by him.

85. It may often become a point of considerable difficulty to decide upon the exact responsibility of a person,

* *Pyæmia* is a form of blood poisoning, associated with the formation of secondary abscesses in various organs and tissues of the body.

† *Erysipelas* is also called "St. Anthony's fire."

‡ *Tetanus* also called "lock-jaw."

§ Likewise called "mortification."

when the death depends only in an indirect manner upon the injury caused by him. In the case of death from injuries, therefore, however slight they may be, the accused should be invariably dealt with by the higher courts. This, however, is by no means always the case. Mr. Gribble remembers one occasion (December 1870), in which, as head assistant magistrate, he committed a man to the sessions court of Kurnool on a charge of having caused the death of his wife, by having in a quarrel struck her on the side with a cob of Indian corn, thereby rupturing her spleen. It was remarked by the sessions judge that this was a case which the magistrate could have disposed of himself. The fact that death occurred should be sufficient to remove a case of hurt—even although, *primâ facie,* it may seem to be one of simple hurt—from the jurisdiction of the magistrate to that of the sessions court. The responsibility of the aggressor in cases of death from secondary causes is a question which is very difficult to decide, and "it is impossible to lay down general rules on a subject which is liable to vary in its relations in every case; but where a wound is not serious, and the secondary cause of death is evidently due to constitutional peculiarities from acquired habits of dissipation, the ends of justice are probably answered by an acquittal" (Taylor). In cases of this kind, however, the public prosecutor should be careful to add another charge, so that if the accused should be acquitted on the more serious charge of homicide, he may still be punished for the act which caused the injury.

Difference between law in England and in India.

86. The law in England and in India seems to differ in this respect,—that whereas in the former country the aggressor is held responsible for the death which may be the result of even a slight injury, in India he would not be found guilty of more than manslaughter. This would be a point for the jury to decide; and it would be for the judge, in awarding the punishment, to take into consideration the circumstances under which the injury was inflicted and the intention of the prisoner. Hence a person

may be found guilty of manslaughter, and an almost nominal punishment be inflicted.

Weapon used effects definition of murder.

87. In India, however, the description of weapon used may, according to the definition of the Penal Code, make the offence necessarily one of murder, in which the judge has not the option of passing any other sentence than one of death or transportation for life. Hence the practice already alluded to and illustrated by the case from Cuddapah (where a man beat a woman to death with a rice-pounder), in which, owing to the circumstances under which the injury that caused death was inflicted, the judge convicted of murder, but at the same time recommended a mitigation of the sentence—a course which the High Court held to be a proper one to adopt.

Tetanus.

88. *Tetanus* is liable to occur as a secondary consequence of almost any kind of wound. It may not occur in cases where wounds of the most severe description have been inflicted; and, on the other hand, it may supervene when the wound is of the smallest and most insignificant nature. It is specially liable to occur in the case of lacerated or contused wounds, and has occurred as a result of even slight bruises. Dr. Taylor quotes the following cases :—" A man slipped and fell flat on his back. He was stunned, but was able to walk home. Next day he was attacked with tetanus and died in seventy hours." It has occurred as the result of a blow on the nose, and it sometimes occurs without any apparent cause whatsoever. Dr. Hehir has met with several instances in which tetanus has appeared in a severe form in persons who had received no wound, but who had been simply exposed to cold and wet,* or to inclement weather. He likewise relates a case in which a simple abrasion of the thumb produced tetanus in a strong healthy man.

* Baynes says that natives of this country are not generally so liable to suffer from the secondary causes resulting from injuries as are people in Europe, *e. g.*, tetanus, erysipelas, etc. We entirely disagree with this opinion, and feel convinced that secondary effects of injuries are more frequently met with in India than in Europe.

Caution necessary in forming opinion whether tetanus caused by wound.

89. It follows, therefore, that a medical witness should be exceedingly cautious before venturing an opinion as to whether tetanus has or has not been caused by a wound. The body should be carefully searched in order to ascertain whether there is any other trace of injury to which the tetanus may be due. Thus, in the case of a boy who was attacked by symptoms of tetanus soon after receiving a blow and a kick from another boy, and who ultimately died of this disease, it was found, on an examination of the body, that there was a recent scar on the ball of the great toe, and it was ascertained that six days previously he had driven a rusty nail into his foot which had caused suppuration,* and there could be no doubt that this, and not the slight blow struck, was the cause of tetanus. Dr. Taylor says : "It is scarcely possible to distinguish, by the symptoms, tetanus from wounds (traumatic tetanus), from that which occurs spontaneously as a result of natural causes (idiopathic tetanus)."

Erysipelas.

90. *Erysipelas* like tetanus, may be the result of slight injuries. Some constitutions are more prone to it than others. Erysipelas frequently occurs after wounds on the head, burns, and scalds. Taylor says : "The medical facts, that the person assaulted has never recovered from the effects of the violence, and that the inflammation set up has suddenly assumed an erysipelatous character, are sufficient to establish this connection." With reference to this disease, however, it should be borne in mind, that, unlike tetanus, the symptoms of erysipelas will show themselves in the injured parts, and it will, therefore, be easier to decide whether or not the disease has been caused by the injury (traumatic Erysipelas).

Delirium tremens.

91. In the case of persons of intemperate habits, delirium tremens is often brought on by even slight injuries. In illustration of this Taylor quotes *Reg.* v. *Heywood,* C. C. C., October 1846. Deceased was assaulted without any serious

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* *Suppuration* is the process by which pus is formed.

consequences. Delirium tremens came on and he died in a few days. The medical opinion was that death was attributable to a shock of the nervous system, causing delirium tremens, and he accounted for that shock by the attack made on the deceased and the blows he had received. In cross-examination, he attributed the delirium tremens to both the blows and excitement. The prisoner was acquitted. This verdict would scarcely seem to be consistent with the Chief Baron's ruling quoted *ante*, that a man is not bound to have his body in so sound a state of health as to warrant an unjustifiable assault. If the deceased had not excited himself previous to the assault, if the assault was an unjustifiable one, and the excitement was in consequence of it, it would seem as if the accused should have been held responsible.

Death from surgical operations.

92. This point involves a question of great importance, *viz.*, the responsibility of a medical man, who, in the treatment of a person injured by violence, conducts an operation from the effects of which the patient dies. The question is one of vital interest to medical practitioners. For all practical purposes, however, it would seem that the two following questions only should be answered : (1) Was, in the opinion of the medical attendant, the operation necessary for the preservation of life ? (2) Was the operation properly conducted according to the best of the practitioner's ability and with due care and attention ? If these two questions are answered in the affirmative, in the event of death resulting from the operation, it must be held to have been caused by the injury which rendered the operation necessary. The operation must, however, have been necessary in order to save life. If an operation was performed merely to prevent the signs of disfigurement caused by an injury and death resulted, the person who caused the injury could not be held responsible. The same rule would apply where the operation had been conducted, not for the purpose of preserving life, but of preserving the use of some limb or member : for instance, A causes an injury to B, in consequence of which it appears to the medical attend-

ant that unless an operation is performed, permanent loss of sight will follow. Danger to life is not apprehended, but merely to the organ of sight. An operation is performed, in consequence of which B dies. In this case A could not be held responsible for B's death. Even if it should be afterwards proved that life might possibly have been saved without an operation, this would not be sufficient to make the operator liable, if, after due care and the exercise of such science and knowledge as he was possessed of, he was convinced that an operation was necessary. Of course, if it could be shown that, in conducting the operation, there was gross negligence,—as for instance, owing to an artery not having been ligatured or tied, the patient died from loss of blood, or, as in a case quoted by Casper, where a portion of the bowel was cut off in mistake for the *umbilical cord*,* and death ensued,—it would be necessary to hold that the operation was the cause of death, and not the original injury. On this point, see Illustrative Cases Nos. XVI to XVIII.

* The *umbilical cord* is the vascular cord-like structure connecting the placenta, or "after-birth," with the fœtus during the stay of the latter within the womb.

ILLUSTRATIVE CASES.

Case No. XI.—Accused held liable for death following an operation based on a mistaken diagnosis.

Reg. *v.* Pym.

In this case, a Lieutenant Seton had been shot in a duel. A tumour* formed in the course of the pistol-shot received by the deceased at the lower part of the abdomen; and this was supposed, by the late Mr. Liston and two other surgeons, to be an aneurismal enlargement from a wound in, or injury on, the femoral artery,† for which it was considered necessary to tie the external iliac artery.‡ The patient died from peritoneal inflammation following this serious operation, and, on inspection, it was found that the tumour (the supposed aneurism) was formed by a mass of coagulated blood, poured out, not from the femoral artery, but from one of its superficial and anomalous branches. Counsel for the prisoner proposed to cross-examine the medical witnesses, in order to show that the wound was not dangerous to life, and the operation not absolutely necessary. Erle, J., said: "I presume you propose to call counter-evidence and impeach the propriety of the operation; but I am clearly of opinion that if a dangerous wound is given, and the best (available?) advice is taken, and under that advice an operation is performed, which is the immediate cause of death, the party giving the wound is criminally responsible." Counsel replied that he was prepared to show that no operation at all was required, or, at all events, an easier and much less dangerous one might and ought to have been adopted. He submitted that a person is not criminally responsible where the death is caused by consequences which are not physically the consequences of the wound, but can only be connected with the first wound by moral reasonings. Erle, J.: "I am clearly of opinion, and so is my brother Rolfe, that where a wound is given, which, in the opinion of competent medical advisers, is dangerous, and the treatment which they *bonâ fide* adopt is the immediate cause of death, the party who inflicted the wound is criminally responsible, and of course those who aided and abetted him." The point was reserved, but as the prisoners were acquitted on other grounds, was not referred to the judges (Taylor). Dr. Taylor goes on to remark, with reference to this case, "No operation would have been required but for the injury, and the prisoner ought not to escape on account of want of skill in a surgeon, or of a mistake by a skilful operator."—*Hant's Lent Assizes*, 1846.

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* The term *tumour* is applied to an abnormal swelling or enlargement of any organ or part from any cause, but usually from a morbid growth.

† The *femoral artery* is the large artery of the lower extremity, which passes down the front and inner side of the thigh.

‡ The *common iliac artery* is a large vessel which passes down along the flank bone on each side and divides into two branches, the *external* and *internal iliac* arteries.

Case No. XII.—Cases where, in India, the accused has not been held responsible for homicide when death occurred as the secondary cause of the injury.

Reg. *v.* Bysagoo Noshyo.

Accused quarrelled with his wife and gave her a kick, which ruptured her spleen. He repented immediately and was found with the woman in his arms helping her. Acquitted under Sections 320 and 322 of the Penal Code, but found guilty under Sections 319 and 321. Sentence: One year's rigorous imprisonment.—*Cal. W. R., Vol. VIII, September* 1867.

Case No. XIII.

Reg. *v.* Robert Bruce.

Accused was tried for 'causing hurt' by kicking a boy who was suffering from diseased spleen. Death was the result of the kick. The judge held that the prisoner had no intention of causing death, but, considering the dangerous consequences of such an act, especially when inflicted on a native of this country, sentenced him to six months' rigorous imprisonment. An Artilleryman.—*(Calcutta Criminal Court, June* 1868.*)*

Taking into consideration the rulings given in the text, there can be little doubt that had these trials taken place in England the accused would, in some instances, have been found guilty of manslaughter.

According to Lord Hale's ruling, quoted in the text, it would seem that an injury of this kind, which was the direct cause of death, would be sufficient to constitute murder. "If a man," says Lord Hale, "has a disease which, in all likelihood, would terminate his life in a short time, and another gives him such a blow as hastens his death, *this is such a killing as constitutes murder.*" Disease of the spleen, however, is not even a disease which need necessarily prove fatal. In this country persons may live on without feeling any inconvenience from a diseased spleen; it is only when it is ruptured that it proves fatal.

Case No. XIV.—Case in which erysipelas held not to be result of injury.

A potman, said to be of intemperate habits, was struck on the left cheek with a quart pot. There was a contusion but no injury to the skin. For thirteen days he suffered no ill effects, when erysipelas commenced. On the same day he was attacked with delirium tremens. On the sixteenth day erysipelas became general. Death took place on the seventeenth day. At the trial the medical witness stated that it was not probable that erysipelas could supervene upon a contused wound thirteen days after a blow, and he expressed his opinion that in this case the erysipelas could not be attributed to the blow. The accused was acquitted. C. C. C., July 1859.—*(Taylor.)*

Case No. XV.—Erysipelas the result of an ulcer and not of a wound.

In 1822, a gamekeeper was charged with the murder of a poacher, whom he shot in the left arm, which had to be amputated. The man died of

erysipelas in the right leg, and the question was actually raised whether the erysipelas could have been caused by the gun-shot wound. It appeared that deceased had an ulcer in the leg attacked; had been for several days exposed; that erysipelas was prevalent in the infirmary, and deceased had been put in a bed occupied by a patient suffering under this disease. Prisoner was acquitted.—*(Taylor.)*

CASE No. XVI.—DEATH BY SURGICAL OPERATIONS.

THE case of Kelly is a remarkable one, as the verdict is utterly at variance with the law as laid down by the various English judges. The deceased was a police constable, who had received a pistol-shot in the back of the neck and died four days afterwards. The medical attendant deemed it necessary to enlarge the wound in order to extract the ball. During the operation nothing serious occurred to cause death. The bullet itself had "fractured and splintered the atlas,* wounding and crushing the soft parts of the neck, and leading to the formation of an abscess." It was considered absolutely necessary to extract the bullet, and had this not been done, there can be no doubt that the death would have been attributed to neglect to extract it. The prisoner was clearly identified, but in spite of this the prisoner was acquitted on the ground that the operation may have been the cause of death. Taylor remarks, "that the failure of justice in this case was chiefly owing to the jury having been allowed to form their opinion on the surgical treatment pursued." They should have been called upon simply to state whether the prisoner was the man who inflicted the wound, and the judge should then have applied the law as to responsibility for a surgical operation.—*Dublin Commissioner's Court, November* 1871.

CASE No. XVII.—MEDICAL RESPONSIBILITY, MALA PRAXIS.

Reg. *v.* Dickinson.

IT was ruled, that where there are different modes of treatment, regarding which men of learning are divided, no man can be held to be "grossly ignorant" if he adopts a course sanctioned by some eminent men even though opposed by others.—*Stafford Lent Assizes*, 1846.—*(Taylor.)*

CASE No. XVIII.—ORDINARY SKILL, AND NOT EMINENT SKILL, TO BE EXPECTED.

Gibbs *v.* Tunaley.

IT was ruled, that the jury were not to expect the same amount of eminent skill in a country practitioner as is to be met with in large towns; but they had a right to expect from him the usual and ordinary amount of skill, care, and attention, which, it was only reasonable to suppose, he would possess; and if, in the discharge of his duty, he applied his professional skill and knowledge to the best of his ability, then, however unfortunate the termination of the case, he was not to be held responsible. The case

* The *atlas* is the uppermost bone of the spinal column, and the bone upon which the head rests.

was one for damages, but this ruling would probably apply to the treatment of a wound; and if death followed, even if the treatment could be shown to be not as good as might have been obtained elsewhere, the person who caused the wound, and not the medical man, would be held responsible for the death.*—*Norfolk Lent Assizes*, 1846.

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* For other leading cases on this subject consult—
Reg. *v.* Brixey, C. C. C., June, 1845.
Reg. *v.* Stowell, Mad. Gaz., Vol. 47, p. 567.
Reg. *v.* Greensmith, Mid. Circuit, July, 1837.
Reg *v.* Nicholas Steinberg.
Reg. *v.* Brough Guildford, Sum. A., 1854.
Reg. *v.* Laurence, Lews, Lent, 1844.
Reg. *v.* McNaghten, January 7, 1843.

The two last mentioned cases are important as affording a remarkable contrast to each other.

For *Mala praxis*, consult—
Williams, J. Winchester Spring Ass., 1847.
Reg. *v.* Dickinson, Stafford Lent Ass., 1846.
Gibs. *v.* Tunaley, Norfolk Lent Ass., 1845.
Baker *v.* Lowe, Queen's Bench, February, 1845.
Cases quoted by Casper, Eng. Ed., 2nd Vol., p. 319.

CHAPTER VI.

CIRCUMSTANTIAL EVIDENCE.

The dress—Murder or suicide—Situation of wounds—Nature and extent of a wound—Direction of a wound—Suicide intended to cause suspicion of murder—Circumstances to be noted at the time of finding the body—Marks of blood—Characters of blood-stains—Ocular inspection of blood-stains—Microscopic demonstration of blood-stains—Action of water on blood-stains—Action of heat on blood-stains—Action of caustic potash on blood-stains—Action of nitric acid on blood-stains—Action of guaiacum on blood-stains—Hæmin crystals produced by treating blood with glacial acetic acid—Spectroscopic appearances—Menstrual blood—Marks of blood not necessarily found on clothes of murderer.

THE evidence treated of in this chapter is what in England is generally to be expected from the medical man called in after the finding of the body or the wounded person. In this country the body has generally to be sent to the medical officer, so that the circumstantial evidence, which is often of such importance in the detection of crime, must, for the most part, be gathered by the police and village authorities on the spot.

93. The *dress* which the deceased wore at the time of death should be most carefully examined, in order to see whether it presents any marks corresponding with the injuries. In this country it often happens that the deceased has worn little or no clothing, but as regards women this is not the case. In the case of wounds caused by a cutting instrument, if there is an incised wound on the body, it will be only natural to expect to find a corresponding incision on the clothing. In the case of blows from a blunt weapon causing bruises or fractures, this rule does not apply. A blow has caused fracture of the skull without leaving any trace on the silk cap which was worn at the time. In 1853, a woman was accidentally knocked down in the street and fell on the back of her head. She was stunned at first, but walked home. Next morning she was found dead in bed.

The dress.

On examination of the skull, two indentations of the parietal bone were found, a clot of blood, and below the clot a fracture of the bone. It was considered at first that the injury was too great to have been caused by such a fall, but on examination of the bonnet which she wore at the time of the accident, two indentations, containing dust and dirt, and corresponding with the indentations on the skull, were found on it. A young man, who wished to create an impression that he had been attacked by robbers, inflicted some superficial wounds on himself, and afterwards made, as he thought, corresponding incisions in his clothes. The imposture was detected owing to his having stabbed through a fold, which he made for the purpose, in his shirt. Had he been wearing the shirt at the time, a stab passing through a fold would make three incisions, two through the fold and one through the rest of the shirt. In this case there were only two.

Murder or suicide.

94. Much valuable evidence can be gained from a careful examination of the body, which will tend to throw light upon this question. The three points to be looked to as regards the wound are,—(1) *its situation*; (2) *its nature* and *extent*; and (3) *its direction.*

Situation of wounds.

95. As a general rule, wounds inflicted by suicides are to be found in the front or lateral parts of the body. This, however, is no proof one way or the other, since an assassin might have attacked the deceased from the front. Even death caused by the discharge of a pistol into the mouth need not necessarily be the act of a suicide, for a calculating murderer might purposely resort to this method of destroying a person in order to conceal the crime. On the other hand, Orfila observes that even wounds situated on the back of the body need not necessarily have been inflicted by another person. A wound traversing the body from the back to the front, however, is scarcely likely to have been the act of a suicide, although it might be caused by falling backwards on a sword or knife fixed in the ground. Take, for instance, the tricks played by jugglers in this country in which they lean backwards over a sword fixed in the ground

and pick up straws with their eyelids. In practising this trick, an accident might well occur. In a case of this kind some light might be thrown upon the matter by the position of the body when found, whether on the back or on the face, but even this would not be decisive, because the wound may not have caused instantaneous death. Suicides rarely cause death by blows, though cases have occurred in which suicides attempted to dash out their brains by striking their heads against a wall. Stabs are generally presumptive of homicide, but not necessarily proof of it, for suicides have killed themselves by stabs in the throat as well as by stabs in the abdomen.

96. A farmer was found dead in the road with his throat cut, *i.e.*, the knife had been inserted behind the ear and the throat had been cut outwards, as butchers kill sheep. The nature of the wound led to suspicion falling on a butcher, who was afterwards found to have committed the murder. Persons labouring under insanity sometimes inflict upon themselves the most extraordinary injuries. Cases have occurred in which persons have torn away large portions of the abdomen, and there is one case of a lunatic who inflicted no less than thirty wounds on the back part of his skull with a cleaver. He lived long enough to admit that he had caused the injuries himself. As a general rule, the existence of a number of wounds is presumptive of homicide, and especially so if several of them in different parts of the body are of such a character that more than one was likely to have caused instant death. Thus, a man with a cut throat, some of the large vessels of the neck being severed and a wound in the heart, could scarcely have cut his throat after the wound in the heart, or *vice versâ*. A most interesting case, in which the question of murder or suicide was decided entirely by the nature of the wounds, is the Uxbridge case (*Reg.* v. *Gibbons*, Middlesex, 1884). The case was very badly reported in the papers, but the Examining Surgeon, Dr. Bowlby, wrote a full report of the whole case to the *British Medical Journal* (January 10, 1885), which has been printed for reference *in extenso* in the Ap-

Nature and extent of a wound.

pendix. The prisoner was convicted, but owing to a considerable discussion which was raised as to whether the case could not have been one of suicide, the sentence was reduced by the Home Secretary to penal servitude for life. The report of the Examining Surgeon is a marvel of careful observation and analysis. Wounds in the throat inflicted by suicides are commonly in the upper part. Generally speaking, all the vessels of the neck to the spine could scarcely be severed by a suicide, but there is nevertheless one case on record in which a suicide "divided all the muscles of the neck, the windpipe, and the gullet, had opened the jugular veins and both carotid* arteries, and had even grazed the anterior ligaments of the spine." (Taylor).

Direction of a wound.

97. In cases of suicide, the direction of the wound is generally from left to right—(with left-handed persons it will be the reverse); and from above downwards, if on the upper part of the body; and from below upwards, if on the lower part of the body. A wound from below upwards, or, in the case of a right-handed person, from right to left, is presumptive of homicide, but not proof thereof. A right-handed murderer standing opposite his victim would probably inflict wounds having a direction exactly contrary to that which they would have, if self-inflicted by a right-handed man. But if the murderer were standing behind his victim, it stands to reason that he could inflict a wound exactly similar in direction to one the victim himself could cause.† As a general rule, it may be said that there is no wound which a suicide inflicts which could not be caused by a murderer, but there may be some wounds, such as those on the back of the body and those with an upward tendency, which, it is improbable, could be self-inflicted—improbable, but not, except in very rare cases, impossible.

Suicide intended to cause suspicion of murder.

98. It must be remembered that, in the case of suicide,

* The *carotid* arteries are the large arteries of the neck.

† We have heard of an exactly similar case occurring in the experience of a Medical Officer in the Madras Presidency.

the deceased may purposely have committed the act under such circumstances as to cause suspicion of murder. In England this may be done in order that his family may get the benefit of an insurance policy, and in this country in order to throw suspicion upon a person with whom deceased was at enmity. Regarding this point, several interesting cases will be found at the end of the chapter.

Circumstances to be noted at the time of finding the body.

99. The following points are of the greatest importance, and should be carefully noted by those who conduct the first inspection of the body:—(1) Is the position of the body that which a suicide could have assumed? (2) Is the distance of the weapon from the body such as to render it improbable that it could have been placed there by the deceased? Before noting these points careful enquiry should be made as to whether the body has been since moved or the dress in any way disarranged. The probabilities are that, in this country, unless the evidence on the first of these points is much more satisfactory than the generality of native evidence, not much importance could be attached to it. As regards the latter point, however, it is often possible to get much important evidence. If a body is found with a mortal wound, such as throat cut, a stab in the heart, or a fracture of the skull, and the weapon is found at a considerable distance, it is improbable that the act could have been one of suicide. If a weapon is found in the hand of the deceased, such as a knife or a pistol, it is most important to notice whether the weapon is grasped firmly or loosely. If the former, the case is probably one of suicide; if the latter, of homicide, and the weapon has been subsequently placed in the hand in order to raise a suspicion that the wound was self-inflicted. At the moment of death there occurs what is called the cadaveric spasm, in which the muscles acquire a sudden rigidity. This is quite different from the *rigor mortis,* which does not set in until a considerable time after death. If, at the moment of death, a person was holding a weapon in his hand, the effect of this cadaveric spasm would be that the weapon would be tightly grasped and would remain so for several

hours. If, however, a murderer placed the weapon in the hand, even though immediately after death, he could only do so by removing the rigidity caused by the spasm, and then, even if the fingers were closed over the weapon, this rigidity could not be restored and the fingers would be limp and pliable.

Marks of blood.

100. Any marks of blood on the body, the clothing, and in the neighbourhood of the body, should be carefully noted. In the case of a person found dead with throat cut, the bloody marks of a left hand were found on the deceased's left arm, thus showing conclusively that the case was one of murder and not of suicide. The body of a woman was found dead at the bottom of a flight of stairs with a fracture of the skull. The accused, deceased's husband, said that she had accidentally fallen downstairs. The fracture was of such a nature that it was probably caused by the fall; but there was also an incised wound in the temporal artery of the body, which, it was improbable, had also been caused in the fall; and at the top of the stairs were found several arterial* spirts of blood on the wall, thus showing that the wound must have been caused at the top of the stairs, and the woman had then either fallen or had been pushed down (*Reg.* v. *Spicer*, quoted by Taylor). Notice should also be taken of the manner in which the blood has flowed from the wounds. If the blood has poured downwards over the body, the wound must have been inflicted when the deceased was in an upright position; if, however, the deceased was wounded when lying down, there may be little or no blood on the body since it may have flowed directly on the ground. Wounds on the hands should be carefully looked for, as the presence of wounds of this kind is strongly presumptive that they have been caused whilst the deceased was in the act of defending himself, or in trying to ward off a blow. As regards this point and

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* We recognise that an *artery* has been wounded when we see the blood spouting out in jets from the wound, and that the blood has a bright red or scarlet color.

others of a circumstantial nature, see the interesting case of *Reg.* v. *Gardner*, at the end of this chapter. In the event of a serious wound being found, such as would cause great loss of blood, with, however, but little trace of blood near the corpse, the death has most probably been caused by homicide, and the wound inflicted after death, which had been caused by some other means, such as strangulation, suffocation,* &c. In examinations of this kind, however, great care should be taken that none of the persons present cause any of the marks which are subsequently found. For instance, a person might accidentally step in a pool of blood, and afterwards leave a bloody footprint on the floor, which might possibly be taken to be that of the murderer. In the matter of footprints, very great care should be taken in the measurement. This should be done with the utmost nicety, and a careful record of the measurement should be kept. In the event of a bloody footprint near the body, corresponding with that of an accused, being found, a good plan is to obtain a separate footprint of the accused, and then to compare it with the one found, and, if possible, to produce both at the trial. In the same way, when a footprint is found in wet mud, the foot of the suspected party should not be placed in the footprint, but he should be made to make another mark, and the two should then be compared. If the accused's foot is placed in the footprint found in wet mud, it is clear that if the new foot is a little larger than the print, the print itself might easily assume the form and shape of the new foot. In the case of footprints of this kind, it would probably not be impossible to dig up the mud, and after it has got hardened in the sun, to send it, together with the imprint of the prisoner's foot, to the court which tries the case. But it must be remembered that an individual's footsteps vary as he might have been walking, running, or standing at the time.

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* *Suffocation*, or stifling, is a stoppage of the respiration produced in any way except by direct compression on the windpipe or by drowning.

Characters of blood-stains.

101. The following are details of the characters of blood-stains under the several heads :—

Ocular inspection of blood-stains.

(1) Blood-stains on dark-coloured materials, which in daylight might be easily overlooked, may be readily detected by the use of artificial light, as that of a candle brought near the cloth. Blood-spots, when recent, are of a bright-red colour, if arterial; of a purple hue, if venous—the latter becoming brighter on exposure to the air. After the lapse of a few hours, blood-stains assume a reddish-brown tint, which they maintain for years.

Microscopic demonstration of blood-stains.

(2) With the aid of the microscope, blood may be readily detected by the presence of the characteristic blood-cells; but even this means of diagnosis may be rendered impossible, by—

(*a*) the blood being long effused;

(*b*) the spot being wetted and then dried;

(*c*) the blood being mixed with other substances; and

(*d*) the spot on the cloth having been much rubbed, or the cloth washed.

Action of water on blood-stains.

(3) Water has a wonderfully solvent action on blood, the stains rapidly dissolving when the material on which they occur is placed in cold water—a bright red solution being formed. Rust is not soluble in water.

Action of heat on blood-stains.

(4) Blood-stains on knives, etc., may be readily removed by heating the metal, when the blood will peel off, at once distinguishing it from rust. Should, however, the blood-stain on the metal be long exposed to air, spots of rust may be mixed with the blood, when the test will fail. The solution of blood obtained in water is coagulated by heat, the colour entirely destroyed, and a flocculent, muddy brown precipitate formed.

(5) The solution of the blood obtained in water is boiled, when a coagulum is formed, soluble in hot caustic potash; the solution so prepared is greenish by transmitted, and red by reflected, light.

Action of caustic potash on blood-stains.

(6) Nitric acid added to a portion of the solution of blood in water produces a whitish-grey precipitate.

Action of nitric acid on blood-stains.

(7) Tincture of guaiacum produces, in a watery solution of blood, a reddish white precipitate of the resin; but on the addition of an ethereal solution of peroxide of hydrogen, a beautiful blue colour is almost immediately developed. This test is so delicate that one drop of blood in six ounces of water may be detected by it; and, according to Dr. Taylor, is, with the spectroscope, the only certain method of discovering washed blood. Washed stains on colourless cloth may be detected by pouring a drop of the tincture of guaiacum on them, and then adding the peroxide of hydrogen. The tincture of guaiacum should be made from fresh resin, and preserved in the dark. The peroxide of hydrogen may be obtained under the name of ozonised ether. Other red colouring matters give a reddish colour to the precipitated resin, but the blue colour does not appear when treated with the peroxide of hydrogen, as above described, except after the lapse of some time, and this at once marks the absence of blood. Dr. Ogston states that he has obtained the blue colour with the guaiacum and peroxide of hydrogen from sweat stains.

Action of guaiacum on blood-stains.

102. Hæmin crystals are produced by treating a drop of blood, or a watery solution of it, with glacial acetic acid in a watch-glass, and then evaporating the mixture. The dried residue now contains the crystals of hæmin, which may then be examined under the microscope. The crystals

Hæmin crystals produced by treating blood with glacial acetic acid.

are rhomboidal in form, tubular, or "otherwise," of a yellowish, yellowish-red, or dirty blood-red colour. When the stain is old, a minute quantity of table salt should be added to the acetic acid solution of the colouring matter of the blood.

Spectroscopic appearances.

103. Two dark absorption bands appear in the spectrum, one situated at the junction of the yellow with the green rays, and the other in the middle of green rays of the spectrum. These may, however, from various causes, be modified. The spectrum of blood treated with carbonic oxide gas presents two similar bands to those of normal blood, but the red and violet rays are more completely absorbed. These bands also do not disappear under the influence of reducing agents, as is the case with normal blood. The spectrum of alkanet root in solution of alum is like that of recent blood, but differs in having a third absorption band between the green and the blue. In a solution of cochineal and ammonia, one black band obliterates the yellow and orange rays. This test requires care and considerable practice at spectrum analysis.

Menstrual blood.

104. There is no means of detecting menstrual blood from human blood, the result of a wound *(Husband)*.

Marks of blood not necessarily found on clothes of murderer.

105. It by no means follows that when a murder has been committed marks of blood must necessarily be found on the clothes or the person of the murderer. If the wound has been inflicted in front by an assassin standing behind, it is of course obvious that no blood would be found on his clothes. Still the fact of the prisoner's clothes not being marked with blood, has been on more than one occasion, urged as a proof of his innocence. This was one of the pleas on behalf of Müller, who murdered Mr. Briggs, by first of all violently assaulting him with a life-preserver, and then throwing him from the railway carriage. It will, of course, be of importance if it can be shown that the accused washed himself or his clothes soon after the time of the murder. In the event of stains being found on a cloth or an instrument, it should not at once be concluded

that they are marks of blood; they may be iron rust, paint or fruit stains, or in this country, betel juice. The clothes or weapon should be most carefully packed and sent to the hospital for chemical examination. Hitherto it has not been possible for the chemical examiner or medical officer to say more than that the signs are those of mammalian blood, for no method was known of distinguishing between human blood and that of animals. The research recently carried out by Dr. Monckton Copeman points to the possibility of distinguishing human blood by testing under the microscope for the crystallisation of Hæmoglobin* (see Report of the Chemical Examiner, Madras. Dr. VanGeyzel, etc., etc., for 1890.) Marks of injury on the suspected party should be carefully looked for, and, if found, noted at the time of arrest. A remarkable case in illustration of this point occurred in 1834, when the victim of a robbery was able to catch one of the robber's fingers between his teeth and to bite off the end between the nail and the joint. The piece of finger was preserved in spirits, and led to the conviction of the robber.

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* *Hæmoglobin* is the substance to which the red colour of the blood is due; it is the chief constituent of the red blood cells.

ILLUSTRATIVE CASES.

Case No. XIX.—Situation of wounds.

Reg. *v.* Wallis.

A man was charged with killing his wife. The body was found on the ground by the side of the bed. There were distinct and severe bruises found on the back of the head and on the temples. In defence, it was urged that the injuries had been caused by the woman tumbling out of bed. This might have accounted for the injuries either at the back of the head or on the temples, but not for both.—*C. C. C.*, 1839.

Case No. XX.—Suicide or Murder.

In 1837, the body of a woman was found with the throat cut. The deceased, when found, was lying on her back, and the razor with which the wound was inflicted was found under the left shoulder. On inquiry it was ascertained that, when first seen, she was lying on her face and the body had been turned round on the back. Blood had evidently run down the fore part of her person, rendering it probable that she had been wounded whilst in an erect position. The wound extended from the *right* side of the chin to within an inch of the left collar-bone; it had divided the windpipe, the gullet, all the muscles of that side and the fore part of the neck, the carotid artery, the jugular vein, and the muscles of the fore part of the neck. The incision was double—one superficial, close under the chin; and the other, a deeper one, appeared to be continued from this. The cut was four and a half inches long and two and a half deep. It was held, and Taylor says correctly, that the wound was inflicted by another and not by deceased. Deceased was right-handed, which would have added to the difficulty, supposing the wound to have been suicidal.—*Taylor*, Vol. I, p. 516.

Case No. XXI.

In 1860, a somewhat similar case occurred. The wound commenced on the left side and continued to an inch and a half from the centre of the chin. Almost all the organs on that side were more or less affected. In the left hand of the deceased was found a common dinner knife, *loosely held* in a reversed position with the back towards the throat. There were three incised wounds on the back of the left hand. The deceased was right-handed. It was held to be homicide. A fellow-servant was suspected, tried, and convicted, on his own confession. It is remarkable in this case that the clothes he had on at the time of the murder showed no traces of blood, except a few small spots on the shirt.—*Taylor*, Vol. I, p. 517.

Case No. XXII.

Reg. *v.* Gardner.

This case presents so many points of interest and importance that a full account of it is necessary. In it is to be found almost every point referred

to in this chapter. The whole case turned upon the medical evidence. Gardner was a chimney sweep, and lived in a small house, of which the other inmates were his wife and a young woman named Humbler. It was alleged at the trial that the prisoner and Humbler were on terms of intimacy, but this was not proved. The wife was found dead in her bed-room about 8 A.M. with her throat cut. It was either a case of suicide or else of murder. If it was murder, it could only have been committed by her husband, or by the woman Humbler, who were the only two other residents. It was proved that about 4 A.M. the husband went out to work, and did not return until after the body was found dead. When the medical man, Mr. Sequeira, was called in, the body was lying in the bed-room and *rigor mortis* had already set in as far as the upper limbs were concerned. The whole body was cold except the abdomen, and as the woman at the time of death was pregnant, this accounted for the warmth in that part of the body. Mr. Sequeira held, that when he saw the body at 8 A.M., it must have been dead at least four hours. In this opinion he was confirmed by another medical witness. The woman was found lying on the floor, partly under a bed. There was a severe wound in the throat, involving the superior thyroid* artery and other vessels. From this about two pints of blood had flowed on each side of the neck on to the floor. There was no blood anywhere else on the body. It was, therefore, clear that the wound in the throat must have been caused when the body was in a recumbent position. Death had resulted from suffocation, owing to the blood having flowed into the windpipe. In the right hand there was a common table knife, loosely held—the back of the blade towards the palm of the hand and the point of the knife pointing upwards. There were four wounds on the inside of one hand and six wounds on the inside of the other. The wounds were across the fingers, as if they had grasped the blade of a knife. The medical evidence was to the effect that the wound in the throat could not have been caused with the right hand. It was, therefore, clear that the woman had been murdered. The only two other inmates of the house were her husband, who had left at 4 o'clock, and the woman Humbler. The question was which of these two could have committed the crime. It was urged in the defence of Gardner that the woman had been killed after 4 A.M., the time when he left the house. If that had been true, the woman Humbler must have murdered her. The medical evidence was, however, conclusive that at 8 A.M., when found, the body must have been dead more than four hours, because *rigor mortis* had already set in, and it is clearly proved that in cases of asphyxia† this rigidity does not commence until after six hours. This brought the time of death to about 2 A.M., when the only person in the room with the deceased was her husband Gardner. When the body was found, the room of the woman Humbler was searched, but nothing was found of a suspicious nature. Three days

* One of the arteries supplying the thyroid gland. This gland is situated across the front of the windpipe, about the middle of the neck.

† *Asphyxia* is a term used to express the effects produced by a stoppage of the function of respiration.

afterwards, however, the man Gardner pointed out some blood which had evidently been lately smeared. It was sworn that this blood had not been there at the time of the first search. The woman was acquitted, but Gardner was convicted, the capital sentence being reduced to transportation for life. It will be noticed that the whole of the evidence in this case was circumstantial, and it was entirely due to the great care which Mr. Sequeira had taken in noting every circumstance at the time he was called in that this crime was detected. This was one of the first criminal cases that Mr. Gribble heard tried, but he has never forgotten the calm possessed way in which the medical evidence was given.—*C. C. C.*, 1862.

CASE NO. XXIII.—SELF-INFLICTED WOUNDS.

THE case of Bolam (Newcastle, 1839) is a leading one on this point. The prisoner was found lying in an apartment which had been set on fire, and near him was the body of the deceased who had evidently been killed with violence, the skull having been extensively fractured by a poker lying near. The prisoner, when found, was either insensible or pretended to be so. He said that he had been suddenly attacked by a man and knocked down by a blow on the right temple. He then felt a knife at his throat. His hands were not cut. He said he received other blows and then became insensible. There was a small wound on the left side of the neck. This wound had merely penetrated the *true skin*,* and there was only a very small effusion of blood from it. There were many cuts in the coat, waistcoat, and shirt, but no corresponding cuts or stabs in the body. The medical evidence was to the effect that the wound was self-inflicted, and on this evidence, in the absence of any proved motive for the crime, the prisoner was convicted.

CASE NO. XXIV.—SELF-INFLICTED WOUNDS.

DR. CHEVERS quotes several cases of self-inflicted wounds. The following may serve as an example:—Three native women and two children were found lying dead in a heap with their throats cut. The husband of one of the females gave the alarm, stating that the crime had been committed by dacoits, who had also wounded and bound him. The wounds on this man were very slight. He said he had been cut at with swords, but the only wounds found were two small *parallel* ones on the inside of the left thigh. One was scarcely more than a scratch, and the other had only just penetrated the true skin. He had clearly, first of all, inflicted the scratch, and then seeing that this would not be enough, inflicted a little deeper wound in the same place. The man was convicted. Dr. Hutchison says that a made-up sword or knife wound can always be recognized by a tailing, owing to the weapon being drawn across the skin. Except in the case of cut-throat, a wound caused by a blow will not show these signs, and

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* The skin is composed of a superficial and a deep layer; the *superficial* is called the cuticle or scarf skin, and is that part which is raised by a blister, or when very hot water falls on the skin. The deep layer is called also the *cutis vera* or "true skin," and consists of blood-vessels and nerves bound together by an elastic and fibre-like tissue.

will be deeper than a wound caused by drawing the weapon.—*Niz. Udalut, N. W. P., 25th February* 1853.

Case No. XXV.—Self-inflicted wounds.

Mr. Perceval, who had been a police superintendent, stated, that when he was connected with the police in Bombay, there were two or three gangs in that city who cut and wounded each other for purposes of false accusation and extortion. They used to cut one another's necks and arms by turns, as the lot fell, and accuse some rich passer-by of having done it. The wounded rascal would call out "murder," and his companions would follow and point out to the police the abode of the alleged culprit, the others declaring that they had witnessed the offence. Several respectable persons were thus disgraced and ruined. At last it fell to the lot of a youthful member of one of these gangs to have his neck cut. The person appointed to cut him was a drunken barber, who, instead of making a slight cut, inflicted a mortal wound. The gang fled, abandoning the youth, whose dying confession led to their arrest.—(*Chevers*, 358.)*

Case No. XXVII.—Cadaveric Spasm.

An interesting case of this kind occurred in Bordeaux. A father and son, after dining heartily together, went to the room in which both their beds were. The son lay down on his bed and went to sleep. He said afterwards that he was roused by the sound of a pistol. His father was then found sitting by his bed, with one arm on the bolster, the other was resting on the inside of the leg and held a discharged pistol. The brains had been blown out. Suspicion at first fell on the son, because the hand still grasped the pistol, and in experiments made by lifting the arm to the head and then allowing it to drop to the position in which it was found, the pistol dropped out of the hand. This very fact, however, established the son's innocence. In the experiments tried after death, the rigidity produced by the cadaveric† spasm had been destroyed, and therefore the weight of the pistol caused it to fall from the hand, but when death occurred the cadaveric spasm would have the effect of suddenly tightening the muscles of the fingers, and thus preventing the pistol from falling. It therefore followed that the deceased, when death occurred, must have been holding the pistol in his hand, and it could not have been placed there after death.‡

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* For other cases of this kind, refer to Chevers, p. 357.

† *Cadaveric* means pertaining to a corpse or the changes in the body produced by death. *Cadaveric spasm* may be defined as a cadaveric rigidity or *rigor mortis* of instantaneous occurrence.

‡ For other cases of cadaveric spasm, see Tidy, Vol. I, p. 64; Taylor, Vol. I, p. 70; Case of Lord William Russell, (ibid. 65, 66,); Case of Robert Reid, Edinburgh, 1855, Taylor, p. 70; See also Ogston, p. 377.

CHAPTER VII.

PROGRESS OF DECOMPOSITION AND INFERENCE REGARDING THE TIME OF DEATH.

Importance of question regarding how long body has been dead—Decomposition—Period in which body cools—*Rigor mortis*—Cadaveric rigidity—Duration of cadaveric rigidity—Commencement of cadaveric rigidity—Four stages of decomposition—First stage of decomposition—Second stage of decomposition—Third stage of decomposition—Fourth stage of decomposition—Internal warmth preserved after rigidity—Hypostases—Hypostasis occurs before putrefaction—Difference between vital and *post-mortem* ecchymosis—Changes produced by putrefaction—Mistaken appearance of poisoning by mineral acids—Melanosis mistaken for effect of sulphuric or oxalic acid or caustic alkalies—Ulcerations of stomach and intestines—Softening and perforation of stomach—Putrefaction causes change in colour of skin—Period of discoloration—Fat bodies putrefy sooner than thin bodies—Circumstances which promote and retard putrefaction—Period of appearance of vesications—Period of appearance of immature maggots or the ova of flies—Period of appearance of mature or moving maggots shorter in India than in England.

Importance of question regarding how long body has been dead.

AS will be seen from the case of *Gardner,* quoted in the last chapter, the question of how long a body has been dead may be of the utmost importance. Upon the correct answer to the question, the life or death of the accused may depend. Before putrefaction sets in, a dead body has to go through certain stages. There is the cadaveric spasm at the time of death; then follows the gradual cooling of the body; then the *rigor mortis;* and then decomposition sets in.

Decomposition.

106. Decomposition almost always commences in certain portions of the body, and others again only begin to decompose after every other portion has been attacked. Decomposition depends, to a great extent, upon the temperature, and therefore the rules laid down in Europe, regarding the time when the several stages occur, will not correctly apply to this country, where decomposition sets in earlier. But in this country, as in Europe, the same successive stages have to be gone through before the last stage

of decomposition is reached, and the medical witness can therefore generally tell the probable period during which a body has been dead within 24 hours after death has occurred.

107. Taylor says, that in one hundred cases observed by Wilks and himself, there was not an instance in which the body had cooled and rigidity had set in within 4 hours. It is rarely that a body cools in so short a time as 6 hours, and in cases of asphyxia, as much as 8 hours is generally required for this process. Period in which body cools.

108. Brown-Séquard states, that in the bodies of healthy persons, decapitated or asphyxiated, cadaveric rigidity did not appear sooner than 10 or 12 hours after death. A remarkable instance of the correctness with which such inferences may be made, occurred in the case of *Jessie McPherson* (Glasgow, 1862)—*Reg.* v. *McLachlan.* The body was first seen by Dr. Macleod on the night of the 17th July, *i.e.*, in midsummer, when the mean temperature of the air was 50° F. "The *rigor mortis* was present in all the articulations,* but it was then departing. The body was perfectly cold, even on the abdomen and at the flexures of the joints. There were no signs of decomposition, and the temperature was unusually cool. By 10 A.M. on the next day, *rigor mortis* had disappeared from all the joints, except the knees and the ankles. Death had resulted from violence and from profuse hæmorrhage. The victim was free from disease. *Rigor mortis* sets in generally from 10 hours to 3 days after death. When, however, death has been sudden, and is due to violence, it sets in more slowly; and Macleod therefore considered that in this case, at least, 48 hours must have elapsed from the time of death until the rigidity set in. But when the *rigor mortis* sets in slowly, it lasts all the longer and *vice versâ*, the average period of disappearance being from 24 to 36 hours. He, therefore, considered that in this case the rigidity must have lasted 30 hours, and, putting these figures together (48 and 30), *Rigor mortis.*

* Or joints.

he arrived at the conclusion that about 3 days had elapsed since death. The evidence subsequently recorded proved, as nearly as could be, that *this was the time which had passed* between death and the examination of the body."—(Taylor, 3rd ed., Vol. I, p. 85.)

Cadaveric rigidity.

109. With regard to cadaveric rigidity, "Taylor says this condition in bodies in Europe begins in from 5 hours to 6 hours after death. Casper says that cadaveric rigidity may come on at any period after death, during a tolerably wide interval of time, in general however between 8, 10, and 20 hours, and may continue much longer than is usually supposed, that is, from 1 to 9 days, while in Bengal the latest period of its commencement during the rains was 7 hours, and in October 20 hours and 30 minutes. The shortest period was 40 minutes in the rainy season and 25 minutes in October."

Duration of cadaveric rigidity.

110. On the duration of cadaveric rigidity, Dr. MacKenzie remarks that the longest period of the duration of cadaveric rigidity was 40 hours while the shortest period was 3 hours, whereas the average period was 19 hours and 12 minutes. In 3 cases it occurred in less than 5 hours; in 6 cases from 5 to 10 hours; in 3 cases from 10 to 15 hours; in 6 cases from 15 to 20 hours; in 14 cases from 20 to 30 hours, and in 4 cases from 30 to 40 hours.

Commencement of cadaveric rigidity.

111. The time of commencement of cadaveric rigidity varies. Of 36 cases the latest period of the commencement of cadaveric rigidity was 7 hours. The earliest period was 40 minutes. The average period was 1 hour and 56 minutes. In 6 cases it commenced in from 30 minutes to 1 hour; in 19 cases from 1 to 2 hours; in 5 cases from 2 to 3 hours; in 2 cases from 3 to 4 hours; in 3 cases from 5 to 7 hours; and in 1 case it had commenced before observation.

Four stages of decomposition.

112. Taylor gives four stages through which a dead body passes, with the average duration of each stage. The periods given have been tested with the experience gained

in this country, and they are therefore now detailed with such modifications as have been considered necessary :—

(a) *First stage.*—This is characterized by the warmth of the body being more or less preserved, and by a general or partial relaxation of the voluntary muscles. During this period the muscles are capable of contracting when stimulated. After considering the various circumstances, such as temperature, clothing, and disease, which may have retarded or accelerated the cooling of the body, it may be inferred that death has taken place from a few minutes to three or more hours previously. First stage of decomposition.

(b) *Second stage.*—In this the body is perfectly* cold throughout, and the cadaveric rigidity is well marked. The muscles are no longer susceptible of contracting under galvanic or mechanical *stimuli.* In such a case death may have occurred from less than 2 hours to 24 hours (three days in cold climates) previously. Naked or scantily covered bodies may become cold externally and rigid in a very short time. Madras *post-mortem* records show that rigidity is commonly present in bodies which have been 2 or 3 hours dead. Second stage of decomposition.

(c) *Third stage.*—Cadaveric rigidity has disappeared. This stage may last for some hours—longer in cold climates. Third stage of decomposition.

(d) *Fourth stage.*—Putrefaction begins, a slight bluish-green discolouration of the skin of the abdomen being usually its first indication. In Madras this stage ordinarily begins about 20 hours after death. Fourth stage of decomposition.

113. It must be borne in mind that there is no very clear Internal warmth preserved after rigidity.

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* A general exception to this rule obtains during the hot weather in India, when the average atmospheric temperature exceeds 90° Fahr. in the shade.

line of demarcation between these periods. For instance, we may have internal warmth preserved after rigidity has occurred. In other cases putrefaction sets in very soon after death. In some cases of death from gun-shot injury, rigidity occurs almost immediately after death. The above periods, therefore, can only be taken to afford approximate indications of the time of death in ordinary cases.

Hypostasis.

114. There are changes which take place in a dead body, the signs of which, if not carefully noted, are calculated to create a false impression of violence. These changes come on during the act of cooling, and are termed cadaveric rigidity and hypostasis. At a later period dark livid patches appear on the skin, which are called sugillation or *post-mortem* ecchymosis. These appearances have occasionally given rise to serious mistakes being committed, owing to a suspicion of violence being raised. Christison refers to two cases, in one of which two persons were convicted, and in the other, three narrowly escaped conviction (see Illustrative Cases Nos. XXIX and XXX).* The causes of these appearances are thus described by Taylor, page 89.

Hypostasis occurs before putrefaction.

115. The first form, *hypostasis*, occurs before putrefaction, and is dependent on a stagnation of blood in the capillary† vessels. When, after death, the capillaries have lost their contractility, the blood appears to stagnate in them in an irregular manner, producing lividity. The skin of the body, although pale at the time of death, becomes covered, during the act of cooling, by extensive patches of a bluish or slate colour, diffusing themselves over the greater part of the trunk and limbs. These hypostases are chiefly seen on the bodies of those who have died suddenly in full health or by a violent death, as in apoplexy, hanging, drowning, suffocation from charcoal vapour, &c; but it may be seen,

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* See also Reg. *v.* Keir, Aberdeen, quoted by Taylor, 3rd ed., p. 88.

† *Capillaries* are the minute ramifications or branches of blood-vessels terminating on the surface of the body, in the substance of solid organs or internal cavities. They are situated between the arteries and veins, and connect these with each other.

though to a less marked extent, in the bodies of those who have died from loss of blood. If, after death, the body is wrapped up in a cloth and allowed to cool, the congestion* of the vessels is apt to take the form of the folds, and the parts actually compressed remain white. The result is an appearance of stripes as from a flogging. "The unbroken state of the cuticle, with the other characters just now mentioned, are, however, sufficient to distinguish this appearance from the effects of violence." Dr. Taylor saw a well marked case in which so strong a suspicion was raised that a coroner's inquest was held. "The forepart of the body was covered with stripes, which were of a red livid colour. They appeared to correspond exactly to the folds of a sheet drawn tightly across the chest, and it was subsequently ascertained that the body of the deceased had been treated in this manner after death." One case (see Illustrative Case No. XXXI) is quoted, in which symptoms were seen which ordinarily are only to be found in vital ecchymosis. Around the patches was a wide border of a pale straw colour, with various shades of green, precisely similar to those which are seen when ecchymosis is gradually disappearing from the living body.

Difference between vital & *post-mortem* ecchymosis.

Table showing the points of difference between a vital ecchymosis (bruise) and a post-mortem ecchymosis (lividity).†

Vital ecchymosis.	*Post-mortem ecchymosis.*
1. *Anatomical seat.*—Effusion of blood from small ruptured vessels into the true skin and the surrounding cellular or areolar tissue (subcutaneous tissue).	1. *Anatomical seat.*—Congested capillaries in the rete mucosum and vascular tissue *above* the true skin.
2. *Position.*—The seat of the injury.	2. *Position.*—Such dependent parts of the body (according to how it may be placed) as are not subjected to pressure.
3. *Appearance.*—The bruise will often be noted to have the shape of the instrument that inflicted the injury. Its colour not generally uniform. The bruised part is often elevated above the surrounding skin.	3. *Appearance.*—Irregular in shape but with well defined edges. The colour uniformly dark. Not elevated above the skin.

* *Congestion* is the abnormal collection of blood in a part or organ.
† From TIDY's *Legal Medicine*, Part I, pp. 78—79.

4. *Extent.*—More or less limited to the parts injured.

4. *Extent.*—At first the stain appears in isolated patches, rapidly running together more or less over the whole of the dependent portions, except those parts subjected to the pressure of the surface on which the body rests.

5. *Results of incision.*—Effused blood at once flows from the cut.

5. *Results of incision.*—No effused or coagulated blood escapes, although perhaps a few bloody points (*puncta cruenta*) where the veins have been divided may be apparent.

6. *Changes by time.*—The dark purple bruise after 18 to 20 hours, or sometimes as late as 2 or 3 days, becomes highly tinted at the edges and of a more or less violet colour. After this the colour of the bruise passes through various shades of green, yellow, and lemon, the centre, however always being the darkest part. During these changes, which are dependent on the oxidation of the effused blood, the spot enlarges. The changes are complete in times varying from a few days to some weeks.

6. *Changes by time.*—The colour remains tolerably constant until putrefaction sets in. No zones of colour form round the edge, such as occur in a life bruise.*

Changes produced by putrefaction.

116. During the stages which the body goes through in the course of putrefaction, there are changes which take place in the viscera or internal organs, which, if not carefully examined, may give rise to a suspicion of death from an irritant poison. Regarding these changes Taylor says: "The mucous membrane† of the stomach may be found of various tints—from a red brown, becoming of a brighter red by exposure to the air, to a deep livid purple or slate colour, and sometimes black from a decomposition of the blood. At the greater end, where the stomach is in

* "According to Tidy, external cadaveric ecchymoses generally show themselves during the 8 or 10 hours succeeding death. In the observations taken at Calcutta during the rains, the latest period at which cadaveric lividity appeared was 31 hours and 30 minutes after death, the shortest period was 1 hour and 38 minutes, and the average time was 14 hours and 33 minutes. In the second set of experiments, the latest period was 21 hours and 30 minutes, the shortest period was 5 hours and 50 minutes, and the average period was 15 hours and 11 minutes."—McKenzie's *Medico-Legal Experiences in India.*

† The *mucous membrane* is the internal coat of the stomach walls.

contact with the spleen or liver, the lividity is often well marked and clearly defined through all the coats. The peritoneal, or outer coat, is of a greenish hue, and the course of the superficial vessels is marked by greenish brown or black lines. These marks, which are the result of putrefaction, may be easily mistaken for the effects of irritant poisoning. There are no rules that will always enable a medical jurist to distinguish such cases." Each case must be judged by its own attendant circumstances. Of course, if symptoms of this kind were found *before* decomposition had set in, they could not be due to that cause, and would probably be due to poison. In cases of doubt, "it is therefore better to withhold an opinion," than to state what can be really nothing more than a conjecture.

117. In the same way the mucous membrane of the stomach and upper part of the small intestines often present, during putrefaction, a yellowish or green tinge, depending on the transudation of the bile or the colouring matter of the fœces contained in the colon. This must not be mistaken for the appearance of poisoning by mineral acids. The medical man who examined the body should be asked whether there was also any softening or corrosion, and whether the throat and the gullet were also implicated. If these signs are absent, the symptoms have not been produced by such poisons.

Mistaken appearance of poisoning by mineral acids.

118. So also melanosis in the stomach, *i.e.*, a deposit of black colouring matter beneath the mucous coat, might be mistaken for the effect of sulphuric or oxalic acid, or caustic alkalies; but as melanosis is unaccompanied by any marks of inflammation, corrosion, or destruction in the mucous membrane beneath, it should be easily distinguished from the effects produced by such poisons.

Melanosis mistaken for effect of sulphuric or oxalic acid or caustic alkalies.

119. Ulcerations of the mucous membrane of the stomach and the intestines are common in India, and should not be confounded with putrefactive changes, but it may not always be easy to distinguish them from erosions due to irritant poisons.

Ulcerations of stomach and intestines.

Softening and perforation of stomach.

120. Softening, and even perforation, of the stomach, occasionally results from the action of the gastric juice* exerted after death. Dr. Hehir has seen several such cases. In these cases the softening is gelatinous, and is not accompanied by signs of inflammation, such as redness at the margins of the softened patch and peritonitis.†

Putrefaction causes change in colour of skin.

121. As putrefaction commences, a change in the colour of the skin of the abdomen takes place, which acquires a pale green hue, gradually deepening and extending to the skin of the chest and the limbs. This is different from the hypostasis already alluded to, because that change only takesplace whilst the body still retains some warmth, and directly the body becomes cold it is arrested. The change now spoken of occurs after the body has become cold and when decomposition has commenced.

Period of discoloration.

122. Regarding the period of appearance of green discoloration, Dr. McKenzie says :—"The latest period at which the green discoloration of putrefaction appeared was 41 hours and 30 minutes, the earliest period was 7 hours and 10 minutes, and the average period was 26 hours and 4 minutes. In two cases it occurred under 10 hours, in four cases from 10 to 20 hours, in 18 cases from 20 to 30 hours, in 10 cases upwards of 30 hours, and in 2 cases it was not observed at all."

Fat bodies putrefy sooner than thin bodies.

123. Fat flabby bodies undergo putrefaction more readily than thin and emaciated ones, and, as already pointed out, the parts which have sustained injuries—such as wounds, lacerations, or bruises—commence to decompose first and then show exaggerations of the actual injuries inflicted. Again, bodies of persons who have died from acute diseases commence to putrefy before those who have died of wasting and chronic disease.

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* The *gastric juice* is the fluid secreted by the small tubular glands of the stomach.

† *Peritonitis* is inflammation of the peritonæum. The peritonæum is the serous or thin membrane investing the inner walls and organs of the abdomen.

Circumstances which promote and retard putrefaction.

124. The circumstances respectively promoting and retarding putrefaction in a corpse are as follows :—

Circumstances promoting putrefaction.

1. *Temperature.*—Warmth assists putrefaction by lessening cohesion. The most favourable temperature for putrefaction is between 70° and 100° Fah. Thus, one day's exposure (in England) in summer (75° F.) may effect a greater alteration than a week's exposure in winter. A warm room promotes decomposition.

2. *Moisture* promotes the process of putrefaction by effecting actual contact between the air and the tissue. The body naturally contains enough moisture (two-thirds its weight) for this purpose but putrefaction is hastened if an excess of moisture be present. Such excess may be the result of disease (as dropsy), or may arise from the previous submergence of the body in water. Thus, the viscera, according to the amount of moisture they contain, decompose at different times after death, the brain (more especially if air gain access to it) and the eyes putrefying rapidly, whilst the bones, teeth, hair and nails decompose slowly. Speaking generally, any cause, or combination of causes, rendering the body preternaturally moist assists putrefaction.

Circumstances retarding putrefaction.

1. *Temperature.*—Below 32° F. (and above 212° F.) putrefaction is entirely arrested. Cold prevents decomposition by intensifying cohesion and heat by effecting the evaporation of moisture. A remarkable instance of the preservative power of cold is given by Adolph Erman, who states that the body of Prince Menschikoff, a favourite of Peter the Great, exhumed after ninety-two years' burial in frozen soil, at Beresov (in Siberia), had undergone hardly any change. The rapidity of putrefaction grows less and less as the temperature rises above 100° F. until (as we have said) at 212° F. it is entirely arrested. Bodies buried in hot sand do not putrefy but become mummified. Thus, warmth *(per se)* has a tendency to retard putrefaction. It is only so far as it is associated with air and moisture that it promotes it.

2. *Moisture.*—If there be sufficient water to allow the entire submergence of the body, putrefaction will be retarded because access of air is thereby prevented. Any circumstances rendering a body unusually dry, *e.g.*, its preservation in a dry and warm atmosphere, retards putrefaction.

3. *Air.*—If blood or flesh be placed in a vacuum its decomposition proceeds slowly.

Similarly, decomposition is slow in atmospheres of hydrogen, of nitrogen, or of carbonic anhydride, or indeed of common air, provided vapour (such as turpentine) be present, capable of absorbing oxygen. Air also promotes decomposition as a carrier to the body of the lower forms of organic life, which themselves have the power to start, or at any rate to promote, chemical changes.

A body putrefies more rapidly in air than in water or after burial. Given similar temperatures, the degree of putrefaction developed in a body during one week's exposure to air will about correspond to that developed after submersion for a fortnight, or after burial in a deep grave for a period of eight weeks.

A naked body putrefies more rapidly than a clothed one. Decomposition will be less rapid in parts where the clothes fit tightly (*e.g*, in the feet with boots on), or if the clothes worn be impermeable to air.

In a leaden coffin, putrefaction is slow from the oxygen soon becoming exhausted. Thus, in the case of bodies buried in lead, the faces may be recognisable after the lapse of long periods of time.

3. *Air.*—If access of air to a body be prevented by any means, such as by its enclosure in a close coffin, by tightly fitting clothes, or by complete immersion in water, putrefaction is retarded.

4. *Combined action of warmth, moisture, and air.*—It is important to consider the action of these jointly as well as separately:—

Moist air promotes putrefaction.

Stagnant air promotes putrefaction.

A moist cold air in winter assists putrefaction more efficiently than a dry hot air in summer.

A moist, hot, stagnant air is the most favourable atmospheric condition for putrefaction.

4. *Combined action of warmth, moisture, and air.*—Dry air retards putrefaction.

Air in motion retards putrefaction.

A dry hot air in summer retards putrefaction more efficiently than a moist cold air in winter.

A dry cold air in rapid motion is the least favourable atmospheric condition for putrefaction.

The removal of moisture from the body by whatever augments evaporation (as *e.g.*, by warmth,

Thus, of the three (air, warmth, and moisture), the presence of moisture is a more important means of promoting putrefaction than either warmth or air.

5. *Effects of Burial.*—Putrefaction is promoted by—

(*a*) The body having been kept for a long time exposed to the air before interment. Besides the mere action of oxygen, insects, during exposure, may find their way to the corpse and deposit their ova in or upon it. These when hatched, materially assist putrefaction.

(*b*) The grave being situated in low ground (as in a valley) and in a damp swampy soil.

(*c*) The body being buried without clothes or coffin. Thus, where infants (as not infrequently happens) have been merely thrown into the ground, and loosely covered over with earth, putrefaction is rapid.

(*d*) Burial in a shallow grave, where the body is exposed to constant variations of temperature. The

free atmospheric currents, etc.,) constitutes the most important means of retarding putrefaction.

5. *Effects of Burial.*—Putrefaction is retarded by—

(*a*) Burial within a short time after death.

(*b*) The grave being on high ground and in a dry absorbent soil. Thus, bodies buried in dry, warm sand often become mummified, in which condition they resist putrefaction almost indefinitely.

(*c*) The body being well wrapped in its shroud and enclosed in a well secured coffin, lead coffins being undoubtedly the most perfect in this respect. The oxygen present in such case is rapidly exhausted, whilst the remaining nitrogen is somewhat antiseptic in its action. Oak coffins are also very durable and efficient, but those made of deal or pine soon rot and fall to pieces. Burial in water delays putrefaction so far as it prevents access of air. Burial in peat delays putrefactive changes in a remarkable manner.

(*d*) Burial in a deep grave. The deeper the grave the more perfect the retardation, because the body

diurnal changes extend to about three feet below ground, and the monthly or seasonal changes to nearly six feet. Thus, putrefaction is more rapid when a body is buried in six feet (or less) of earth than when interred in a deep grave.	is placed beyond the daily and seasonal changes of temperature. At a depth of six feet the temperature of the ground is low and fairly uniform.
(*e*) Burial in marl or clay (if air have access), or in loose mould, or in porous soil impregnated with animal and vegetable matters.	(*e*) Burial in sand, gravel, or chalk.
[It is possible, under these conditions, if the grave be not too dry, that adipocere may be formed when putrefaction is suspended.]	[In such cases adipocere is rarely formed unless water finds its way into the grave.]
6. *Age and sex.*—Childhood. According to Orfila, putrefaction is rapid in the female.	6. *Age and sex.*—Adults and old age. Males are said to decompose less rapidly than females.
7. *Cause of death.*—Acute exhausting diseases, such as hydrophobiæ typhus, and typhoid dropsy from organic disease, a diseased state of blood (pyæmia), delivery, etc, promote putrefaction.	7. *Cause of death.*—Thus putrefaction is delayed after death from chronic diseases (Case 31*c*) unless they be associated with dropsy. In the case of plethoric persons who have died suddenly in good health, and after death by asphyxia, putrefaction is usually slow in appearing.
8. *Corpulence.*	8. *Leanness.*
9. *Certain poisons.*—It is said that putrefaction is rapid after death by prussic acid, morphia, and narcotic poisons generally (Casper); also after death from certain animal and gaseous poisons, such as CO (carbon monoxide) and H_2S. (sulphureted hydrogen). The bodies of the intemperate putrefy rapidly.	9. *Certain poisons.*—Arsenic, antimony, chloride of zinc, also chloroform, phosphorus, and strychnia, when they are actually the cause of death, usually retard decomposition.
[N. B.—In this case, the true question, no doubt, is not so much the action of the poison as the question whether the patient was so exhausted by fatigue or pain before death that rigidity supervened rapidly?]	In arsenical poisoning, putrefaction ordinarily commences as usual, but seems to stop after it has commenced. Then a process very similar to mummification begins. After death by sulphuric acid and other mineral acids, putrefaction appears to be retarded, possibly from the acid preventing the formation of ammonia or combining with it as soon as formed.

10. Any parts affected by bruises, fractures, or wounds putrefy rapidly. Such portions of the body look worse a few hours after than before death. Putrefaction is specially rapid in parts that have been subjected to surgical operation.

11. Lime, if freely applied to a dead body, may retard putrefaction by preventing access of air. In smaller quantities, however, it acts both as a deodorizer and antiseptic. The attempts, not uncommonly made, to destroy a body by covering it with lime, usually on the contrary succeed in preserving it. In tanning skins, the application of lime is adopted for the purpose of removing the fat and separating the hair. Possibly a little external softening of the article may be thereby effected, but no change results so far as the tissues generally are concerned, the fact being that lime prevents putrefaction (and even arrests its progress if already started) by changing the skin into a hard and dry substance.

12. *Mineral acids.*—By such means putrefaction is retarded by the destruction of the tissues.

13. Various antiseptics.*

125. Concerning the period of appearance of vesications on the surface of the body, we make the following extract from Dr. MacKenzie's book :—"The latest period of the appearance of vesications on the surface of the body was 72 hours, the earliest period was 35 hours, and the average period was 49 hours and 39 minutes. In 17 cases it occurred in from 35 hours to 48 hours, in 10 cases from 48 to 60 hours, in 5 cases from 60 to 72 hours, and in 4 cases it was not observed at all."

Period of appearance of vesications.

* Tidy's *Legal Medicine*, Vol. I, p. 88 *et seq.*

Period of appearance of immature maggots or the ova of flies.

126. The latest period at which immature maggots appeared was 41 hours and 30 minutes, the earliest period was 3 hours and 20 minutes, and the average period was 25 hours and 57 minutes. In 2 cases it occurred in less than 10 hours, in 5 cases from 10 to 20 hours, in 11 cases from 20 to 30 hours, in 5 cases upwards of 30 hours, and in 13 cases it was not observable, as the deposit took place in the internal cavities, the mouth, nostrils, etc.

Period of appearance of mature or moving maggots shorter in India than in England.

127. The period of appearance of the mature or moving maggots is much shorter in India than in Europe. "The latest period of the appearance of the mature or moving maggots was 76 hours, the earliest period was 24 hours and 18 minutes, and the average period was 39 hours and 43 minutes. In 6 cases it occurred in from 34 hours and 18 minutes to 30 hours, in 16 cases from 30 to 48 hours, in 11 cases from 48 to 72 hours, in 1 case upward of 72 hours, and in 2 cases it was not observed."*

Rate of putrefaction.

128. Guy gives the following rate of putrefaction in the internal organs:—In from four to six days after death, dirty red patches appear on the posterior wall of the *stomach* and gradually extend over the whole interior. These changes are sometimes mistaken for the effects of corrosive poison. The *intestines* follow next and then the *spleen*; then the *liver*, which, however, may retain its firmness for some months; putrefaction commences with a green colour on the diaphragmatic or upper surface. The *brain* follows next; it collapses after death, and its putrefaction commences in the line of the blood vessels, and in two to three weeks time the brain becomes quite diffluent. The brain of children, however, is the first organ destroyed by putrefaction. The *heart* and *lungs* putrefy more slowly, so that traces of disease are distinguishable in them long after they are quite decomposed. Orfila detected pneumonia thirty-seven, and signs

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* MacKenzie's *Medico-legal Experiences in Calcutta.*

of pericarditis fifty-seven, days after death. The *kidneys* resist putrefaction even longer than the heart and lungs; the *bladder*, the *œsophagus* (or food-pipe), and the *pancreas* (or sweetbread) resist still longer; and the *diaphragm** may be distinguished even after four to six months. The *uterus* (or womb) resists putrefaction longest of all, and enables us to distinguish the sex after the complete destruction of all the other soft parts. Casper found it at the end of nine months in a fit state for examination, so that he could solve the question, whether the deceased died pregnant, when all the other viscera† were gone and the bones almost separated from one another.

129. The period of death, as inferred from the state of decomposition, is often a point of great importance, but the cases quoted are so conflicting, that no safe rules can be laid down as to the exact time which has elapsed since death. There are so many different factors which have the effect of accelerating or retarding decomposition, that each case must be judged by its own circumstances; and whenever there is any possibility of doubt, the medical witness should be most careful not to give a decided opinion. It is, however, clearly established that decomposition sets in soonest when the body is exposed to the air.

Opinion as to time of death from state of putrefaction.

130. In buried bodies decomposition is slow in dry sandy soils, as in Egypt, or in gravel and chalk, to which water has no access. It is quick in marl or clay, and quicker in proportion as air or water has access to the spot. It is slower in deep graves than in shallow ones, and is quicker in bodies buried without any covering, becoming slower in proportion as the coffin is able to resist the air and the surrounding influences of decay. As regards water, Dr. Chevers gives some notes on the periods when, owing to the generation of gases, bodies rise to the surface in this country. The earliest

Decomposition in air, earth, and water.

* The *diaphragm* is the muscular partition between the abdominal and thoracic cavities.

† The word *viscera* is the plural of viscus. The term viscus is applied to any organ or part having an appropriate use.

period mentioned by Dr. Woodford, at the hottest time of the year, was twenty-four hours. The period of formation and evolution of gases is of some importance. Dr. MacKenzie* says, "this was manifested by the distension of the abdomen, or by the exudation of froth from the mouth and nostrils, or by the expulsion of fœces through the anus." In his 36 cases "the latest period at which gases were evolved was 34 hours 30 minutes, and the earliest period was 5 hours 50 minutes, while the average period was 18 hours 17 minutes. In 9 cases it occurred in from 5 hours 5 minutes to 10 hours, in 10 cases from 10 to 20 hours, in 14 cases from 20 to 30 hours, in 1 case from 30 to 40 hours, and in 2 cases it was not observed at all." In the cases observed during the rains, the latest period at which gases were evolved was 34 hours 30 minutes, the earliest period was 5 hours 50 minutes, and the average period was 18 hours 17 minutes; while in October the latest period of its appearance was 47 hours, the earliest period was 16 hours 10 minutes, and the average period was 29 hours 17 minutes. Casper says that in about eight or ten days the gaseous products of decomposition begin to be developed and to distend the abdomen.

Buoyancy of decomposed body in water.

131. An interesting case occurred within Mr. Gribble's experience. A woman was killed on the night of a Friday, and the evidence went to show that the body must have been thrown into a well† about midnight. On the following Sunday morning, about meal-time, which was about 8 or 9 A.M., the body was found floating with a heavy stone attached to it. The woman was said to have been of slight figure and short stature, and therefore probably, when alive, did not weigh more than 100 to 105 lbs. The stone itself weighed 92 lbs., so that the decomposition in 30 hours must have been so rapid as to generate gas capable of raising, not only the body itself, but the dead-weight

* *Medico-Legal Experiences in Calcutta.*

† A large square well, such as is used for irrigation purposes.

attached to it. The stone was attached to the waist, and the body, when found, was lying horizontally on the surface of the water on its side. The water was from ten to twelve feet in depth, and the specific gravity of the stone was 2·7. This case is of interest, as showing the extreme buoyancy of a decomposed body in water, and the rapidity with which gases can be generated. The murder occurred in September 1883.

Notes of a river accident, regarding buoyancy of dead bodies.

132. Out of a number of victims of a river accident which occurred in Calcutta in 1867 (January), notes were taken of the time when the bodies came to the surface. In none of these cases were any bodies found under three days, and in some cases they did not rise to the surface until six or seven days after the accident. As a general rule, bodies in this country, when found in wells of average depth, rise on the third to the fifth day, and then show all signs of decomposition. In the accident above alluded to, the four first bodies were recovered three and a half days after death, but no mention is made of any signs of decomposition. Dr. MacKenzie's experience with regard to the period in which *saponification** takes place is of the utmost importance and interest. He says:—" During the nine years that I have been considering, in my notes on Medico-legal Examinations in Calcutta, I find I have had 8 cases of saponification, 7 of which are most interesting, as they show that this condition is more readily formed in the human body in the River Hooghly, as well as in the damp soil of Bengal during the rainy season, than in Europe. The first of the 8 cases was the body of an adult native female, of about 25 years of age, apparently that of a Mahomedan woman from Behar or the North-West Provinces, found

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* *Saponification* refers to the combination of an alkaline base with a fatty acid by which means these materials are converted into soap. Medico-legally it refers to the process by which the wax-like substance called *adipocere* is formed by the exposure of fleshy tissue to moisture with the exclusion of air, *i.e.*, in the earth or under water. *Adipocere* itself consists of fatty acids in combination with alkaline earths and ammonium. Human bodies in moist burial places often undergo this change.

in the water near the bank of a large tank called Motee Jheel, within the Calcutta race-course, with her throat cut, a portion of the body eaten away by fishes, and apparently having been in the water entangled among the weeds for several days."

ILLUSTRATIVE CASES.

Case No. XXIX.—Hypostasis mistaken for marks of injury.

Reg. *v.* Keir.

A man named Keir and his mother were tried on the Aberdeen Circuit for the murder of the father of the man. The prisoners were condemned, but the only evidence of any weight against them was the appearance of a broad blue mark on the fore part of the neck, which the witnesses compared to that produced by strangulation. There was, however, great reason to believe, from their own description of it, that it was due to natural changes after death.—(*Taylor*, page 88, Vol. 1.)

Case No. XXX.—Hypostasis mistaken for marks of injury.

Three men left a public house intoxicated and quarrelling with one another. On the next morning one of them was found expiring in a wood, and he died soon afterwards. Two surgeons deposed that they found the marks of numerous contusions all over the body, and upon this deposition the two companions of the deceased were committed and subsequently tried. At the trial, Drs. Bell and Fyfe proved, to the satisfaction of the court, that the apparent contusions were nothing else than the livid patches, or hypostases, which sometimes occur spontaneously on the dead body after many kinds of death. The accused were acquitted.—(*Taylor*, page 88.)

It is worthy of remark that hypostasis is frequently noticed in cases where persons have died under the effects of intoxication, and to this cause may, perhaps, be due the symptoms in the case quoted by Beck (*vide* page 51.)

Case No. XXXI.—Hypostasis mistaken for marks of injury.

A man died in 1837, in the Dreadnought hospital, of disease of the heart. Just before death he had been auscultated,* and there were then no marks on the body. Eighteen hours after death the body showed numerous patches, varying in size. They greatly resembled bruises, and occurred only in those parts of the body which were not compressed by the position in which it was lying. A peculiarity about these marks was that they appeared exactly like vital ecchymoses, with a border of pale straw colour with various shades of green and blue. In remarking on this case, Taylor says: "Had the body of this person been found lying dead on a high road, and had it been proved that another man had been seen quarrelling with him, what might have been the opinion expressed? We can scarcely hesitate to say, unfavourable to the accused." The hypostases might have been wrongly held to be the marks of blows, and the death from heart

* Examined by means of the stethoscope.

disease might have been held to have been brought on by the excitement caused by those blows.

CASE No. XXXII.—EFFECT OF THE GENERATION OF GAS IN DECOMPOSITION.

DR. CHEVERS quotes a case in which the effect of the gas, generated in a decomposing body, was to eject from the uterus a four months' fœtus, together with the acrid root which had been used for the purpose of procuring abortion. Taylor quotes a similar case, in which the gases had sufficient force to expel the fœtus from the uterus when the woman had died during labour and undelivered. A similar case was also the subject of a coroner's inquest at Sydney in 1864.*

CASE No. XXXIII.—DIFFICULTY OF CALCULATING EXACT PERIOD OF DEATH FROM THE STATE OF DECOMPOSITION.

THE leading case on this point, quoted by all the medical jurisprudents, is Reg. *v.* Byrne,† in which a woman was tried for the murder of her husband (Dublin, 1842). The prisoner and the deceased were in the habit of drinking to excess. On this occasion they had retired to their room and had remained in it for eight days. Four days before he was found, the husband had been seen alive at the door. On the eighth day the prisoner called one of her sons, and the body of the husband was found in an advanced stage of decomposition, whilst the prisoner was still in the room. The medical witness, who first saw the body, was led to believe that it had been dead, at least, four to five days. There were no special marks on the body of injuries except certain discolorations, and internally the heart was empty, and so were the vessels of the brain. The body was found on its face. During the time they had been together in the room, a large amount of spirits had been consumed. The prisoner made two statements: first, that she slept in the bed on Thursday and Friday, and that deceased died on Friday. She subsequently stated that he died on Saturday, the day when the body was discovered. Two medical witnesses said, deceased must have been dead four to five days; two declined to give an opinion; and one said that such changes might take place in from twenty-eight to thirty hours. (The month was July, and the room itself was very close.) On the one hand, it was argued that the deceased had died from strangulation, judging from some black marks on the neck, and the protrusion of one eye and of the tongue; and, on the other, it was argued that these marks were natural; that deceased may have smothered himself whilst in a state of intoxication, by turning his mouth and face on the pillow, or that he might have died in a fit. The discoloration of the face, the protrusion of the eye and tongue, and the discharge of fœces might be ac-

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* *Note.*—The generation of gas frequently leads to *post-mortem* hæmorrhage, and this bleeding is apt to be produced by pressure on an inflated part; the gas thus compressed, seeking to escape, forces out the blood from the nearest aperture, hence the old superstition, that a dead body would bleed at the touch of the murderer.

† For full report of this case, see TIDY'S *Legal Medicine*, Vol. I, p. 126.

counted for by his dying in a convulsive struggle, or the symptoms of the eye and tongue might be simply due to advanced decomposition (of which there are numerous recorded cases). The emptiness of the heart, which was adverse to the theory of strangulation (asphyxia) was referred to the mechanical effect of gaseous putrefaction on the organ. The emptiness of the brain was unexplained. No motive was assigned for the murder, and the principal point against the prisoner was that she must have been in the room, at least, twenty hours after the death, without calling for assistance. The prisoner was acquitted, and Taylor says, "The jury were properly informed by the learned judge (Baron Pennefather) that they were not to convict the prisoner on probability, however strong, or on a mere preponderance of medical opinion."—*(Abridged from* TAYLOR *and quoted by* TIDY *and* BECK.*)* *

CASE NO. XXXIV.—CASE OF A BODY BEING FOUND IN THE SAME HOUSE AS THE MURDERER.

THIS was rather a singular case, and was tried in the November sessions at Cuddapah (1883). Prisoner was a Brahmin of dissolute habits, and deceased was an elderly woman. One day, about noon, prisoner was seen taking the deceased to his house. She did not return. After some time the daughter went to the house and enquired after her mother. Prisoner told her that she had gone away to a village two miles distant. This was found to be untrue. The daughter returned in the evening, and told this to the village authorities, who went to prisoner's house. Being late, they did not search it, but remained in the house with the prisoner the whole of the night. During this time the prisoner was described as if under the influence of drink. Next morning the body of deceased was found in an inner room, perfectly naked and covered with several deadly incised wounds. The floor and walls showed considerable traces of blood. In this case the prisoner had himself given a written statement that he had killed the woman, otherwise it is probable that he would have been acquitted. No other motive for this singular murder was given than that the deceased had probably seen a bottle of arrack and some meat in his house, and that he had killed her for fear that she would tell this in the village, and he, being a Brahmin, would lose caste. If this was the real motive, prisoner was at the time of the murder probably intoxicated. He was convicted and hanged, and is said, before execution, to have confessed to the police. There was a great deal of popular indignation against this man, especially amongst the Brahmins of the town, numbers of whom came to see his execution.

* See also Reg. *v.* Mahaig (TIDY's *Legal Medicine,* Vol. I, p. 129.)

CHAPTER VIII.

WOUNDS, RUPTURES, AND OTHER INJURIES AS AFFECTING DIFFERENT PARTS OF THE BODY.

Wounds of the head—Difference between concussion of the brain and intoxication—Fractures of the skull—Wounds on the face—Injuries to the spine—Incised wounds to the chest—Torture by *Bansdola*—Confessions obtained by police—Confessions made to police inadmissible as evidence—Ordinary occurrence in evidence of police officers—Extortion of confessions—Pressure on the chest as a means of extorting confessions—Cases of sudden death in lunatic asylums—Rupture of internal organs the result of violent injuries to chest and abdomen—Wounds of the lungs—Wounds of the heart.

SCALP wounds of an incised nature, unless of considerable extent, rarely produce serious effects. Contused wounds of the scalp, on the other hand, are dangerous, because of their tendency to assume an erysipelatous character.

Wounds of the head.

133. Wounds on the head are very various in their results. The most serious injuries,—involving fracture of the skull and even loss of a portion of the brain,—are sometimes followed by perfect recovery, whereas the slightest contusions may be attended by fatal results. A slight blow, leaving scarcely perceptible marks of injury, may produce abscess of the brain, and death. Two of the most dangerous results of a severe blow on the head are concussion* and effusion of blood on the brain causing compression. In cases of this kind death is sometimes instantaneous, but at others it does not occur until after many days.

Difference between concussion of the brain and intoxication.

134. Taylor points out the necessity of a careful examin-

* *Concussion* is a lesion of the brain, producing symptoms of loss of power and functions generally, and usually caused by great violence offered to the brain itself, though no fissure, fracture of the skull, or extravasation may be discovered.

ation on the part of the medical attendant in order to distinguish between concussion and the results of intoxication. A man may be intoxicated, but at the same time may also be suffering from concussion. Dr. Taylor says :* "There is nothing in the state of the brain which will enable a practitioner to distinguish whether concussion or intoxication had existed and had been the cause of the symptoms. In both cases the vessels may be congested. The discovery of alcoholic liquid in the stomach may lead to a presumption that the deceased had been intoxicated, while marks of violence on the head may favour the view that he had suffered from concussion. At the same time, it is possible for extravasation of blood to be produced on the brain by a blow which leaves no mark of injury whatsoever. Cases have occurred in which death has happened from effusion of blood on the brain without any violence, simply as the spontaneous result of violent exertion. Cases of this kind are no doubt rare, but the possibility of their occurrence should make a medical man very cautious in the expression of a decided opinion where there are no marks of injuries to be found. The general condition of the blood-vessels should always be noticed in such cases, since disease of their coats would favor rupture. A case is recorded in which effusion of blood on the brain has been caused by a violent blow on the neck over the jugular vein. Death was instantaneous. Effusion of blood on the brain may also be produced by excitement, but cases of this nature are rare, unless the excitement has been caused, or has been accompanied, by blows. Where a death of this kind has occurred, careful notes should be taken of the habit of body of the deceased. If of intemperate habits, or of a full habit of body, the death may have occurred from apoplexy, the result of excitement only, and not of a blow.

Fractures of the skull.

135. Fractures of the skull are very common in this country, and are generally produced in Northern India by the

* Vol. 1, p. 639.

lathi or bamboo, and in the Madras Presidency by the rice-pounder and frequently by pounding with a stone. It is generally found that not only has one blow been struck, but a great many, and the skull is frequently fractured in several places and often smashed to pieces. Fractures of this kind are generally caused in the heat of a quarrel, but it is worthy of remark that pounding with a stone is frequently the result of a deliberate act, and especially when the deceased has been suspected of sorcery. A favorite punishment of a reputed sorcerer is to pound out his teeth with a stone. There are also several instances of murders having been committed in this manner by women, on the persons of young children, whom they have robbed of their ornaments. As regards fractures, it may be remarked that it is most difficult to produce a fracture of the skull on a body already dead. Casper speaks of several experiments that he made to test this, the instrument used being the wooden mallet employed to prop up the head during dissection. Fractures need not necessarily be caused on the spot where the blow falls on the head, and a severe blow on one part may produce a fracture at a point diametrically opposite to the part struck. These *counter-fractures,* (or fractures by *coutre-coup* as they are called), are due to the physical law, that the parts in which the force applied to any hollow dome becomes concentrated are diametrically opposed to each other (Baynes). A compound fracture of the skull, which is a common result of a blow with a blunt weapon, may likewise be caused by a fall on a sharp stone, but rarely by a fall on a flat surface.

Wounds on the face.

136. Wounds on the face are dangerous as generally causing deformity, owing to the risk of the brain becoming affected. Injuries to the eye are of frequent occurrence, and, if made by a sharp-pointed instrument, such as a needle or a style, there is danger of the brain being pierced. An instance is given of this in Illustrative Case No. III. In the same way, a sharp-pointed instrument might be inserted through the nose, and could thus reach the brain

without leaving any external mark of injury. Dr. Hehir has seen two such cases. A crime, by no means unfrequent, both in Bengal and in the wilder and less civilized portions of the Madras Presidency, is mutilation of a female by cutting off her nose. This is generally done as a punishment for an act of adultery, and a similar incident is told in one of the stories of the Panchatantram, in which the husband, by mistake, cut off the nose of a procuress instead of his own wife.

137. In many cases of sudden death, where there are no marks of violence to be found, if a careful examination is made, it will probably be found that there is injury to the spinal cord. A slight injury has been known to cause death by giving rise to inflammation. The spinal cord is also liable to compression from slight causes resulting in almost instantaneous death, but leaving no external marks of injury. Fractures of the vertebræ or bones of the neck have occurred from very trifling causes, such as suddenly throwing the head back; and there is one recorded case (Taylor) of a fracture of this kind having been caused by a patient turning in bed while his head was compressed by the pillows. In this case death did not ensue for sixteen months. A child has been known to be instantaneously killed in consequence of its having been lifted up by the head. Taylor remarks: "Injuries to the spine and its contents are generally the results of falls or blows, either on the head or the lower part of the column. The secondary consequences of these injuries are sometimes so insidious as to disarm suspicion, and death may take place quite unexpectedly some weeks after the accident." Diving head foremost into shallow streams, etc., is a well-known cause of disclocation of the vertebræ of the neck.

Injuries to the spine.

138. Incised wounds to the chest, which do not penetrate into its cavity, are seldom dangerous. Contused wounds, on the other hand, are far more dangerous, and the danger is in proportion to the violence used. By the fracture of a rib, or of the sternum (or breast-bone), a bone may be

Incised wounds to the chest.

displaced and driven inwards, thereby wounding the lungs, liver, or the heart; or the viscera may sustain severe injuries and be ruptured.

Torture by *Bansdola.*

139. Dr. Chevers alludes to a practice "well known in Bengal, especially in the Northern districts," which is called *bansdola.* It is a mode of compressing and rolling the limbs or body between two bamboos, with a degree of severity ranging between that which tortures severely, by contusing the muscles, or by rendering respiration difficult, and that which reduces the muscles to a jelly, or breaks the ribs, and crushes the lungs into a disorganized pulp. This practice of *bansdola* is not confined to the chest, but is often inflicted on other portions of the body. For instance, the upper portion of the thighs may be compressed between four bamboos, two on the upper part and two underneath. A space of four or five inches is left between the two upper bamboos, and the ends of the upper bamboos are tightly tied to those below. The part between is then beaten with a ruler for a considerable space of time. There is no need for any violence, and unless this is used, there remain scarcely any external marks, and there is nothing but a slight general swelling, which may be mistaken for stoutness. The pain inflicted, however, is intense, and the injury to the muscles so great, that cases have occurred in which the part thus injured mortified, causing death. In one case of torture of this kind, which occurred whilst the deceased was in custody of the police, "the body was discovered one mass of bruises. The 4th, 5th, 9th, 10th, and 11th ribs of the right side were broken, and the 8th, 9th, 10th, and 11th ribs were dislocated on both sides of the spine. Both lungs were injured, and the whole of the muscles of the back, shoulders, and loins were reduced to a pulp. The evidence went to show that the deceased was beaten and poked by the constables with their staves, their wooden sandals, and their elbows, and that his body was jumped upon" (Chevers). The date of this brutal act of torture is not given, and it might perhaps be doubted, whether, in the

march of civilization, torture of this kind is now-a-days practised. It is probably not practised to such an extent, because detection would now be inevitable; but there can, we think, be little doubt, that in a great many cases, confessions made to the police are obtained by improper means.

140. In preparing the materials for this book, nearly one thousand reports of cases decided by the Foujdaree Udalut have been gone over, and it is a remarkable fact that in almost every case of grave crime there has been a confession before the police. In a very large number of cases the confessions have been made for apparently no reason whatsoever, and very often the confession is the sole evidence against the prisoner, corroborated by the stolen property, which he himself voluntarily shows. It is remarkable that we find crimes of violence, which have clearly been committed with every sign of premeditation, and with every precaution to avoid detection; and yet, with no evidence against them, the prisoners voluntarily confess and show where they have hidden the stolen property. This frequently occurs in trials now, and though, in the course of twenty years' experience in criminal cases, Mr. Gribble cannot remember one well-substantiated case of torture whilst in police custody (that is, substantiated by marks and evidence of violence), there have occurred many cases in which the very gravest suspicion has attached to the manner in which a confession was made.

Confessions obtained by police.

141. Confessions made to the police are rightly in this country inadmissible as evidence, except in so far as they relate to property produced; but when once elicited, the accused is quickly taken before a sub-magistrate, to whom he repeats the confession, and it then becomes admissible. With the recollection of recent injuries before him, of course, the accused does not hesitate to repeat to the magistrate his confession, and it is only when he comes before the higher court that he withdraws it.

Confessions made to police inadmissible as evidence.

Ordinary occurrence in evidence of police officers.

142. A phrase of very ordinary occurrence in the evidence of a police officer is as follows: "After being for three days in our custody, one morning, about half an hour after head constable ——— had taken the prisoner to the vanka for purposes of nature, he came back and stated that he was willing to confess. In consequence of that statement, we took him before the sub-magistrate;" or, "after making that statement, the prisoner took us to the jungle, where, from under a stone, he produced the stolen property," &c. It is worthy of remark, that even if these statements have been extorted, they are, in a great number of cases, extorted from the actual criminals, because they are able to show where the property is hidden.* On the other hand, it is very significant that the property produced very often consists of articles, such as a common cloth or a plain silver bangle, almost incapable of identification, since every other person will have articles of a similar description.

Extortion of confessions.

143. There is good reason for believing that in many cases false confessions are extorted. The accused are induced to say that they have committed the offence, and are then *told* by the police to lead the way to a certain spot where some worthless articles have been already hidden away (see Illustrative Case No. XLII of a false confession). Of course, in cases of this kind, a considerable amount of violence is not used, because it would leave marks which would lead to detection. A small dose, however, of *bansdola,* if judiciously administered, leaves no traces, and is capable of inflicting quite enough pain to induce a man to confess. There are other ways of extorting confessions, by means which leave no traces whatsoever, such as mixing large quantities of salt with the food and then withholding water, preventing the prisoner from getting any sleep, &c.,

* At Umritsar, in 1875, four innocent men confessed to several murders committed in the city. It was only after the arrest of the real murderers that it was found out that the first confessions had been extorted. (Surgeon-Major CULLEN).

but practices of this kind must be treated under a different head.

144. It is remarkable what an enormous amount of pressure the chest will bear without causing death. This is proved by the immense weights which, in former years, were used to extort confessions, and as punishment for crime in Europe in the *peine forte et dure.* Even in the last century this barbarous practice was still in force. In 1735, at the Lewes Assizes, "a man had laid upon him, one by one, three hundredweight—then fifty pounds more. 'When he was nearly dead, having all the agonies of death upon him,' the executioner, who weighed sixteen or seventeen stone, lay down upon the board which was over him, and killed him in an instant." "In January 1720, William Spigott, at the Old Bailey, bore four hundredweight on his body for more than an hour, and thereafter was hanged. At the Old Bailey, in January 1721, a highwayman, after enduring the punishment an hour, and having three or four hundredweight put upon him, at last submitted to plead." (Chevers, page 441).

Pressure on the chest as a means of extorting confessions.

145. It is by no means uncommon to find cases of sudden death in a lunatic asylum after there has been a struggle between the patient and his keeper. With a violent maniac, the keeper, in closing with him, generally places his knee upon the patient's chest and endeavours to throw him down. The fall of two heavy bodies, with the knee of one of them in this position, is calculated to cause severe internal injury without leaving any external signs. In 1870, a case of this nature occurred in England, in the lunatic asylum of Prestwich, in which *seven* ribs were broken without leaving any external mark. A very similar case occurred in 1884 in this country, when the insane Rajah of *Kolapoor* died suddenly after a struggle and a fall from his keeper.

Cases of sudden death in lunatic asylums.

146. It is by no means uncommon, where death has been caused by sudden violent injuries to the chest and abdomen, that the whole of the internal organs are ruptured

Rupture of internal organs the result of violent injuries

to chest and abdomen.

without leaving any external traces of injury. *Casper* gives a remarkable case in which a wagoner was crushed by the wheel of his own cart against a tree. There were no external marks of injury, but on dissection the spleen, liver, and heart were all found to be ruptured and lacerated to a frightful extent, and the whole of the internal organs more or less affected. The same author gives another case of a sailor who was killed by the fall of a mast, and who died after six hours. *There was no trace of ecchymosis to be found over the whole body,* but the following internal injuries were found,—a small fissure in the right orbital plate of the frontal* bone; on the right side five ribs were fractured, from the third to the seventh inclusive, and about six ounces of serum were effused into the pleural† cavity; at the posterior surface of the liver there were four lacerations, obviously caused by the protruding ends of the fractured ribs, and about six ounces of blood effused into the peritoneal cavity; further, the bones of both fore-arms were transversely fractured; and finally, the right femur‡ was completely splintered. A remarkable case is also quoted in the *Lancet* of April, May, or June 1884, in which a man broke a rib by overstraining himself in throwing a heavy weight. Death in these cases is caused by hæmorrhage, which may take place internally.

Wounds of the lungs.

147. A wound of the lung may be recognized, among other symptoms, by the frothiness and florid colour of the blood which issues from the wound, as well as by the expectoration (or coughing up) of blood. Wounds to the lungs may be caused directly, as by stabs or gunshot, or indirectly, by the fracture of a rib or the collar-bone, the end of which may lacerate the organ. The lungs may, however, be ruptured by external violence only without the fracture of a bone. A case is recorded of a boy who was killed by being driven over by a carriage. No bone

* The bone of the forehead.
† The *pleura* is the covering of the lung, consisting of two layers, between which, under certain morbid conditions, fluid may accumulate.
‡ Or thigh-bone.

was fractured, but the lungs were found lacerated, and the consequent internal hæmorrhage was the cause of death.

Wounds of th heart.

148. As has been previously shown, wounds of the heart are not so instantaneously fatal, as is generally supposed, and there are many instances of persons who have survived for many days after sustaining severe injuries to that organ.* In the same way as the lungs, the injuries may be caused directly or indirectly by the fracture of a bone, or even by a severe blow, which, without breaking a bone or leaving any external mark, may yet cause a rupture of the heart. There is one case recorded of a woman who swallowed a fish-bone, which, by protruding through the stomach, perforated the heart (Taylor, Vol. I, page 659). Ruptures of the heart from natural causes are not uncommon. "Hope asserts, that in ruptures from natural causes, it is the left side of the heart, and particularly the left ventricle,† in which a rupture is most frequently found." In some cases rupture of the heart from disease may excite a suspicion of death from violence. The natural causes of rupture of the heart are violent mental emotions, such as anger, fright, terror, paroxysms of passion, sudden or excessive muscular efforts, or violent physical exertions in constrained positions. If the heart is once in a diseased condition, as, for instance, fatty degeneration,‡ rupture

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* See Taylor, Vol. 1, p. 629.

Case of *Duc de Berri*, who survived eight hours after a wound in the left ventricle to the heart.

Medical Gazette (Vol. XIV, page 334), case of a boy who survived five weeks, being employed during the time. After death a mass of wood was found lodged in the substance of his heart.

Case of a suicide who survived one and a quarter hours after two bullets had passed through both ventricles into the heart.

† The heart contains four chambers—one *auricle* and one *ventricle* on each side. The auricles are uppermost.

‡ *Fatty degeneration* is a morbid condition in which there is either an abnormal accumulation of fat around the heart and between its muscle fibres (called *fatty infiltration*), or in which the actual fibres themselves are transformed into fat (*fatty metamorphosis*).

and death may be brought on by very slight causes. A very slight excitement, or even the exertion required for an ordinary walk, has been sufficient to produce this result. An injury to the diaphragm, *i.e.*, the muscular partition between the chest and the stomach, may prove the cause of death long after the injury has been caused. The wound may heal, but the cicatrix may, by some unwonted exertion or from a slight blow, again open. Death in such cases is generally caused by some portion of the viscera obtruding through the wound and becoming strangulated.

ILLUSTRATIVE CASES.

CASE No. XXXV.—INSENSIBILITY FOR TWENTY-FOUR HOURS.

MR. GRIBBLE gives the following account of a personal experience. "In 1865 I rode in a steeple-chase. The horse was a very violent one, and in the middle of the course bolted. We got into a nullah of false earth. The horse plunged and then sank up to the knees, turning right over and cutting open her chest, so that she had afterwards to be shot. I was thrown on my head, on a laterite rock, and was picked up insensible. This was early in the morning. I remained insensible for twenty-four hours and got up next morning perfectly well, but without the slightest recollection of what had happened the day before, or how the accident had occurred. The whole day was wiped out of my life. During the time of insensibility, which was caused by concussion of the brain, my ear, which, when I was picked up, was in my mouth, was sewed on, and when I awoke, I was astonished to find my head bound up. I appeared next morning at early tea, to the surprise of the rest of the residents of the house, who were all talking at the time of the probability of having to bury me."

Similar cases of partial loss of memory, or of "being knocked out of time," are not uncommon, and the behaviour of a person suffering from the effects of concussion, sometimes closely simulates that due to alcoholic intoxication. For cases of injury to the brain, see Taylor, Vol. I, 628, and particularly the case of a boy whose brain was shot completely through by the breech of a burst pistol. The boy was not even rendered insensible, but died after 24 hours; also for injuries to the brain, ibid., p. 649.

CASE No. XXXVI.—CAUSE OF EFFUSION ON THE BRAIN.

Reg. *v.* Phipp.

A CASE was tried (Gloucester Summer Assizes, 1845), in which the following facts were proved: During a fight the prisoner struck the deceased a severe blow under the left ear. He fell and died in a few minutes. After death blood was found extravasated on the part corresponding to the seat of violence, and this, in the opinion of the medical witness, satisfactorily accounted for death. The defence was that the effusion might have been caused by over-excitement; but the judge (Patterson, J.) is reported to have said, that if it were proved that two people were fighting together—blows were struck—one fell to the ground and died, and afterwards internal injuries were found corresponding with the external marks of violence, no power on earth could persuade him that such blows were not the cause of death. The prisoner was found guilty.—(*Taylor*, Vol. I, p. 647.)

Case No. XXXVII.—Cerebral hæmorrhage from a blow.

The pole of a wagon in motion was said to have struck an old woman of sixty-five in the left side and thrown her down on the pavement. She was picked up senseless and died in a few hours. There was no trace of injury on the body. The cranial bones, of the unusual thickness of a quarter of an inch, were also uninjured. The cerebral membranes were, however, very strongly hyperæmic, and the whole brain floated, so to speak, in a layer of coagulated blood, two lines thick. It was decided that this cerebral hæmorrhage (so rare in its extent) could only have been caused by external violence, and that a headlong fall upon a stone pavement was a very probable cause.—(*Casper.*)

Case No. XXXVIII.—Brain damaged by injuries to the face.

In 1735, Macklin, the Comedian, was tried for causing the death of Thomas Hallam, by thrusting a stick into the eye. On inspecting the body, it was ascertained that the stick had entered the brain through the orbit.

In 1843 a boy killed another at Liverpool, by wounding him with a gimlet in the eye. The brain was perforated, and he died in two days.

A boy, aged ten, had the birch end of a common broom thrust several times into his face by one of his companions. He became stunned and was carried home in a state of stupor. He afterwards complained of violent pain in the eyeball and forehead. Symptoms of inflammation and fever supervened, followed by coma, convulsions, and insensibility. He died in about sixteen days after the accident. On dissection, the orbital plate was found perforated, and pus and lymph were effused on the base of the brain. The left ventricle contained three ounces of pus; it communicated with a wound in the orbit. A small portion of bone was partially separated from the orbital plate and projected upwards.—(*Taylor*, Vol. I, page 652).

Case No. XXXIX.—Fractures of the skull.

Chevers mentions many cases in which the skull has been fractured to pieces by blows and from pounding with a stone.

In 1852, three persons were sentenced to death, at Bareilly, for murdering a man, by beating him on the face with "*lattees* and an iron coulter," the bones of the head and face were shattered to pieces, so that even the jaws and teeth were broken into small pieces.

A woman was sentenced to death at the same town, for the murder of a girl of ten, for the sake of her ornaments. The civil surgeon found the poor child's face brutally wounded and beaten into a mass by repeated blows.

In 1856 a man was sentenced to death, at Masulipatam, for killing his wife. The quarrel was a very slight one, the judge says, "either connected with some ceremonies, in boiling water with two pots, one placed on the mouth of the other, or that deceased had allowed the marriage of their daughter to take place in the prisoner's absence." The prisoner drove the other

persons out of the house, and attacked his wife with a rice-pounder, beating her so severely that the rice-pounder "was found broken in three pieces around the body of deceased weltering in gore."—(*Madras Foujdaree Udalut*, 1856).

Casper also gives a case of a man who killed a shoemaker whilst at work, the object being to steal a pair of shoes. The prisoner confessed, that after giving the first stroke with the hammer, he became quite furious and felt as if he could keep on battering him "for ever." This confession entirely corresponded with what we found, *viz.*, four and twenty individual injuries of the head, extending even to the face.

Case No. XL.—Murder of suspected sorcerers.

In 1859, at Chingleput, two persons were found guilty of having murdered a man and his wife, whom they suspected of having bewitched them. The professed object was to beat out their teeth, which was done with slippers. The body of the man was found dead, the face and head being fearfully mutilated. The woman died shortly afterwards, and was also covered with wounds about the head and face. The evidence went to show that the deceased had been pounded with stones in addition to being beaten with slippers. Numerous other instances of this kind might be quoted, but this may serve as an example.—(*Madras Foujdaree Udalut*, 1859.)

Case No. XLI.—Injuries to the spine, dislocation of the neck.

This is a very usual way of causing death in this country, especially in the case of children. The neck is twisted and dislocated, causing laceration of the spinal cord. In 1860 a woman was condemned to death, at Combaconum, for murdering a child in this manner, for the sake of stealing his jewels. There were in this case no external marks of violence.—(*Madras Foujdaree Udalut*, 1860.)

Taylor, Vol. I, page 655, mentions a case in which a man, who had been drinking, lay down to sleep in a yard intoxicated. Next morning he awoke sober, but could not move his legs. He was taken into hospital after twelve days, and died shortly afterwards. In addition to paralysis, he was suffering from peritonitis, and, on examination, the tenth dorsal vertebra was found broken in its body and arch. A large clot of blood was situated on the sheath of the cord; this had caused the paralysis. It was proved, that whilst intoxicated he had a fall, after which he walked home and lay down to sleep. Hence there was reason to believe that, in spite of the fractured vertebra, he had not been rendered incapable of walking. The effusion of the blood which caused the paralysis could only have occurred some time after the fracture, as the result of slow oozing.

Case No. XLII.—Torture.

Dr. Chevers has collected an immense amount of information on this point. The practice of *bansdola*, or compression and beating, has been

alluded to in the text. A few cases only will be here cited in further illustration.

In 1854, certain policemen of Dinagepore were tried for torturing a man suspected of dacoity. The man died, and the civil surgeon stated, "that death had been caused by congestion of blood on the brain from torture by severe pressure, and that simple beating without some such process as *bansdola* would not cause the appearances he found without more decided marks." The judge considered it to be clear that beating was performed skilfully by sharp raps on the joints, and punching and poking with *lattees*, so as not to leave any external marks, and that the *bansdola* torture was inflicted after he fell.

In the Madras Presidency, a common torture is, or rather was, by the Kittee (Telugu, Cheerata), in which the fingers are placed as in a lemon-squeezer, or by bending back the fingers over a stick, or by squeezing the ears and also the breasts of females. These tortures are all done in such a way as to leave no external marks. Another mode of torture is tying up by the fingers; tying the arms and legs and rolling the body down an incline; lighting a fire beneath the soles of the feet, &c. Both of these last tortures were made use of in the case of the district moonsiff of Sholinghur, alluded to in the text, under the head of mutilation.

Case No. XLIII.—False Confession.

Confessions obtained by improper means are naturally often false. The following is a peculiar case, and was tried before Mr. Gribble at Cuddapah in 1884:—

A Mahomedan lad was charged with the murder of a boy of about ten years of age; the murder was accompanied by theft of a pair of silver bangles. The accused was last seen with the deceased about dusk going out to some prickly-pear bushes near the village. Next day the body of the deceased was found in a shallow pond among the bushes. There were marks of injury on the neck and head, and as the stomach contained muddy water, it appeared that he had been thrown in the water whilst still living. The bangles were missing. The prisoner was arrested on suspicion, and one of his feet was said to correspond with a footmark in the mud near where the body was found. The evidence regarding this, however, was not very satisfactory. This was all the evidence against the prisoner. He remained in police custody for three days, and then one morning, about half an hour after the *head constable had taken him to the latrine* for the purposes of nature, a constable came and reported that the prisoner was willing to confess. The sub-magistrate was then sent for, and the prisoner took them all to a spot near where the body was found, and from under a stone produced a pair of bangles. These bangles were exactly like any other bangles, with no distinguishing mark, but were sworn to by the deceased's father and by the goldsmith who made them. The whole case turned upon the identity of the bangles. Deceased's father swore that they had been made from Rs. 16 worth of silver, and the jeweller also

swore that this was their weight when made. They were then weighed in court, and found to weigh only Rs. 15-8-0. They had only been made ten months before, and had been worn by deceased on two occasions for twenty days each. It was impossible that in forty days' wear there could have been a wastage of eight annas of silver, and therefore it was clear that the bangles produced by the prisoner could not have been the bangles worn by the deceased. The only possible explanation was, that bangles resembling those worn by deceased were placed under a stone by some one else (police?) and that then the prisoner was induced to confess and was told where the bangles had been concealed. In his confession (afterwards withdrawn), the prisoner said that deceased had fallen in by accident, and that he had then taken off the bangles and hidden them away because he was afraid. The prisoner was acquitted. It is exceedingly possible in this case that the prisoner was the murderer, but the story of the bangles was palpably false, and a false confession of this kind can only be accounted for in one way, *i.e.*, it was obtained by improper means at the latrine: there were, however, no marks of injuries on the accused.

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CHAPTER IX.

RUPTURE OF INTERNAL ORGANS.

Deaths from rupture of internal organs—Order of frequency of rupture of internal organs—Organs most frequently ruptured—Spleen most frequently ruptured—Rupture of the spleen—Symptoms of rupture of spleen—Prognosis of rupture of spleen—Treatment of rupture of spleen—Treatment of rupture of spleen in case of internal hæmorrhage—Further remarks on rupture of the spleen—Statistics of uncomplicated rupture of spleen—Cause of rupture—Particulars of cause of rupture of spleen—Causes assigned for homicidal cases of rupture of spleen—Race and sex of cases of rupture of the spleen—External marks of violence in cases of rupture of spleen—Size of the spleen—Position and size of rupture of the spleen—Cause of death in cases of rupture of spleen—Condition of spleen in cases of rupture—Weight of spleen in cases of rupture—Statistics of complicated ruptures of the spleen—Causes of rupture of spleen—Reasons assigned for accidents—External marks of violence—Condition of spleen in foregoing cases—Size of spleen—Nature of ruptures of spleen—Situations of ruptures—Period of survival after rupture of spleen—Causes of death resulting from rupture of spleen—Percentage of causes of complicated ruptures of spleen—Nature of injuries caused to spleen—Rupture of the liver—Causes of rupture of liver—Symptoms of rupture of liver—Prognosis of rupture of liver—Ruptures of liver most common in Calcutta—Ruptures of liver only—Statistics of rupture of liver—Causes assigned for accidental cases of rupture of liver—Condition of liver in cases of rupture—Nature of ruptures of liver—Position of ruptures of liver—Size of ruptures of liver—Cause of death in cases of rupture of liver—Region where blood was effused from liver—Period of survival after rupture of liver—Analysis of causes of rupture of liver—External marks of violence—Fractured bones as complications—Diseased liver as complication—Ruptures as complication—Hæmorrhage as complication—Blood in abdominal cavity—Quantity of blood extravasated—Time between injury and death—Rupture of the bowel—Rupture of bowel caused by severe contusion—Rupture of the intestine—Rupture of intestines—Analysis of cases of ruptures of intestines—Nature of substances extravasated into abdominal cavity—Length of time deceased survived after the accident—Cause of death—Injuries to the abdomen—Remarkable case of complicated rupture of liver, spleen and kidney—Wounds to the bladder and gall bladder generally prove fatal—Rupture of the heart—Wounds of the heart—Fatality in cases of wounds and rupture of the heart—Signs of wound of the heart—Case of rupture of spleen recorded by Chevers—Period of

survival in case of rupture of spleen—Mutilation as a punishment—Difficulty in defining cause of fracture—Fractures during life and after death—Fractures as affecting locomotion—Gun-shot wounds—Gun-shot wounds of entrance—Appearance of gun-shot wound from conical or round bullet—Nature of gun-shot injury depends upon distance from which gun was fired—Gun-shot wound—Premeditation defined in case of gun-shot wounds—Curious case of suicide by pistol-shot—Presumption in case of gun-shot wound in temple or mouth—Blank charge often causes wound like gun-shot wound—Flash of discharge not unfrequently renders assassin's face distinguishable—Cut-throat.

Deaths from rupture of internal organs.

THE frequency with which deaths from rupture of internal organs is met with in India necessitates the addition of a special chapter to this edition. We had prepared such a chapter from recorded cases scattered through the various medical journals, but the appearance of Brigade-Surgeon S. C. MacKenzie's *Medico-Legal Experiences in Calcutta* has induced us to fall back almost entirely upon his valuable contribution to our meagre knowledge on this subject. We quote freely from that author's manual. In opening the section on rupture of internal organs, Dr. MacKenzie states :—"During the period of nine years embraced by my notes on the medico-legal autopsies which have come under my notice as Police Surgeon of Calcutta, there were 111 ruptures of internal organs. The following figures show the various ruptures which came under my notice and the number of each in order of frequency :—

Order of frequency of rupture of internal organs.

Liver alone	34
Liver and spleen	3
Liver and right kidney	2
Liver and left kidney	1
Liver, spleen, right kidney, and right lung .	1
Liver, spleen, and heart	1
Liver and left lung	1
Liver and right lung	1
Spleen only	29
Spleen and liver	5
Spleen and brain	1
Spleen and left kidney	3
Spleen and stomach	1
Spleen and left lung	1

Spleen, spinal cord, diaphragm, right kidney, bladder, liver, heart, right lung, and left lung	1
Spleen, liver, and right kidney . . .	1
Intestines only	11
Intestines and liver	1
Heart only	5
Heart and spleen	1
Bladder only	2
Ureter only	1
Kidney only	1
Kidney and liver	1
Uterus and vagina	1"

Organs most frequently ruptured.

150. From the foregoing it list will be seen that ruptures of the liver, spleen, intestines, and heart, were most frequently met with, and it is to these that we propose to confine our attention. General experience is not in accord with Brigade-Surgeon MacKenzie's as to the relative frequency of rupture of internal organs.

Spleen most frequently ruptured.

151. Of all internal organs the *spleen* is the one most frequently ruptured, although, as has been seen, this accident was met with less frequently than rupture of the liver in Dr. MacKenzie's 111 cases. It is almost natural to expect that the spleen would be the organ most commonly damaged in injuries of the abdomen, when we consider that a large proportion of the people of India are more or less constantly suffering from malarial enlargement of that organ.

Rupture of the spleen.

152. The causes of *rupture of the spleen* are,—blows, kicks, falls, wheels of vehicles passing over the organ, penetration by fractured ribs, gun-shot injuries, etc.

Symptoms of rupture of spleen.

153. The nature and position of the injury received must be borne in mind, as there are no distinctive symptoms. There will be marked general shock, anxious countenance, coldness of the trunk and extremities, feeble pulse, sighing respiration, abdominal pain—especially over the seat of

injury, and dullness on percussion* over the splenic area due to extravasated blood.

Prognosis of rupture of spleen.

154. The prognosis† is unfavourable, as, owing to the vascularity of the organ, the hæmorrhage is generally severe, even more so than when the liver is similarly injured. If the substance of the spleen be not very extensively torn, recovery may take place. In the surgical history of the American War three cases of recovery are recorded, two being the result of gun-shot injuries and the third a bayonet wound. If the shock and hæmorrhage do not lead to an immediately fatal result, peritonitis‡ and abscess are the complications to be feared.

Treatment of rupture of spleen.

155. The treatment consists of rest in the horizontal position, warmth to the general surface of the body, ice, or warm fomentations over the region of the spleen, morphine subcutaneously or by the rectum to relieve pain, brandy or egg-flip in teaspoonful doses at short intervals.

Treatment of rupture of spleen in case of internal hæmorrhage.

156. Should symptoms of internal hæmorrhage continue whilst no external wound exists, abdominal section§ at the edge of the left rectus muscle is to be recommended. If laparotomy show that the hæmorrhage will not cease by exposure, or the application of the thermo-cautery,|| the splenic artery may be ligatured, or the spleen itself removed, either directly or by means of a ligature. This last procedure has been successfully accomplished. All blood must be cleared from the peritoneum and the abdominal cavity be thoroughly washed out with some warm

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* The word *percussion* is the process of striking lightly upon any part of the body, especially the thorax or abdomen, with the view of ascertaining morbid conditions by the resonance of the stroke.

† The word *prognosis* in practical medicine and surgery is applied to the pre-vision and judgment regarding the progress and result of a disease.

‡ *Peritonitis* is inflammation of the membrane lining the interior of the abdominal cavity and surrounding the viscera.

§ *Abdominal section* or *laparotomy* is the opening of the abdominal cavity by incision.

|| The process of *thermo-cautery* (also called Paquelin's cautery) referred to is the application of a hollow platinum point kept at a uniform temperature by a current of benzene vapour.

antiseptic lotion, carefully sponged dry, and closed after the introduction of a glass drainage-tube.*

Further remarks on rupture of the spleen.

157. As a result of his Calcutta experiences, Dr. MacKenzie remarks:—" After ruptures of the liver, ruptures of the spleen have been most commonly observed in the course of my medico-legal experience in Calcutta. During the period of nine years that I have been considering, I met with 43 cases, of which 29 were not complicated with ruptures of other organs, and 14 in which one or more of the other internal organs were injured. I propose to deal with ruptures of the spleen, under two heads. First, those in which the only lesion was one or more ruptures of this organ; and, secondly, those in which the ruptures of the spleen were complicated with ruptures of other viscera.

Statistics of uncomplicated rupture of spleen.

158. " There were recorded in the period referred to, 29 cases, or 67 4 per cent. of uncomplicated ruptures of the spleen.

Cause of rupture.

159. " These 29 ruptures were referred to the following causes:—In 23 or 79·3 per cent. to accidents, in 4 or 13·7 per cent. to homicide, and in 2 or 6·8 per cent. the injuries were spontaneous ruptures.

Particulars of cause of rupture of spleen

160. " Of these 5 or 21·7 per cent. were results of kicks from horses, all on persons of syces or grooms; 5 or 21·7 per cent. were owing to falls from heights, as from off the roofs of houses, etc.; 3 or 13 per cent. were caused by heavy weights falling on the region of the abdomen of coolies or porters—in the first case by a bag of country produce falling on a coolie, in the second by a bale of jute striking a coolie, and, in the third, by a heavy wooden case or box falling on a coolie; 3 or 13 per cent. were cases of persons falling into the holds of ships and pontoons; 2 or 8·6 per cent. were cases of persons knocked down and injured by runaway horses; 1 or 4·3 per cent. was caused by a country boat being swept by the violence of the bore or tide under a steamer, and one of the crew being crushed between the boat and the

* HEATH'S *Dictionary of Practical Surgery*, Vol. I, p. 472.

vessel; 2 or 8·6 per cent. were of men falling down on the road and off steps; 1 or 4·3 per cent. of the cases was that of a boy subject to epileptic fits—the rupture was the result of the kind attentions of his mother, who, to relieve the pain he complained of in his abdomen, rubbed it for some-time with her hands. In 1 or 4·3 per cent. of the cases no cause was assigned.

161. "Of the homicidal cases, in 2 or 50 per cent. they were due to blows, one in a quarrel and one in a drunken brawl, the blow in this case being inflicted with a large heavy wooden pin; in 1 or 25 per cent. by being pushed against a brick wall; and in 1 or 25 per cent. of the cases, death was the result of a kick received by a native from a European.

Causes assigned for homicidal cases of rupture of spleen.

162. "Of the 27 persons who died from uncomplicated ruptures of the spleen, 24 or 82·7 per cent. were adult native males, 3 or 10·3 per cent. were adult females, 1 or 3·4 per cent. was a native boy, and 1 or 3·4 per cent. a native girl.

Race and sex of cases of rupture of the spleen.

163. "In 20 or 68·9 per cent. of these cases no external marks of violence could be detected, and in 9 or 31 per cent. they were present.

External marks of violence in cases of rupture of spleen.

164. "The following statement shows the size of the spleen ruptured:—

Size of the spleen.

Number of cases.	Length of spleen.	Breadth of spleen.
2	12 inches.	7 inches.
2	14 ,,	8 ,,
1	12 ,,	9 ,,
1	12 ,,	4 ,,
1	12 ,,	3 ,,
1	9½ ,,	5½ ,,
1	9 ,,	8 ,,
1	8½ ,,	6 ,,
1	8½ ,,	5 ,,
1	8 ,,	5 ,,
2	7 ,,	5 ,,
1	7 ,,	4½ ,,

Position and size of rupture of the spleen.

165. "The position of the ruptures in these 29 cases were as follow :—In 9 or 31 per cent. they were on the inner surface and through the hilus; in 4 or 13·7 per cent. on the inner surface; in 2 or 6·8 per cent. on the inner surface of the lower end; in 2 or 6·8 per cent. on the inner surface of the upper end; in 1 or 3·4 per cent. on the inner surface, the lower end, and the outer surface; in 1 or 3·4 per cent. on the outer surface; in 2 or 6·8 per cent. on both surfaces, in 2 or 6·8 per cent. on both surfaces and at the upper end; in 1 or 3·4 per cent. at both ends, through the hilus and the posterior border; in 1 or 3·4 per cent. at the lower end; in 2 or 6·8 per cent. through the whole substance of the spleen; and in 2 or 6·8 per cent. the organ was reduced to pulp.

Cause of death in cases of rupture of spleen.

166. "The cause of death in 37·1 per cent. of Dr. MacKenzie's cases was hæmorrhage, while in the non-complicated ruptures 86·2 per cent. died from loss of blood; in these cases 35·7 per cent. died from shock; in the other class, 6·8 per cent. in the uncomplicated cases, 3·4 per cent. died from the combined effects of shock and hæmorrhage, while in the complicated ones, 7·1 per cent. died from the same causes."* Putrefaction had not commenced in any of the 29 cases of complicated rupture when examined.

Condition of spleen in cases of rupture.

167. "This organ in 28 or 96·5 per cent. of the cases was found to be diseased, and in only 1 or 3·4 per cent. to be healthy.

Weight of spleen in cases of rupture.

168. "The weight of the spleen was not taken in 20 or 68·9 per cent. of the cases; and in 9 or 31 per cent. it was found to vary from 10 ounces to 3 lbs. 14 ounces.

Statistics of complicated ruptures of the spleen.

169. Regarding complicated ruptures of the spleen, Dr. MacKenzie says:—"Out of 43 ruptures of the spleen, 14 or 32·5 per cent. were accompanied by injuries of other organs. Of these, 5 or 33·7 per cent. were complicated with ruptures of the liver; 3 or 21·4 per cent. with rupture

* *Medico-Legal Experiences in Calcutta*, pp. 85-86.

of the left kidney; 1 or 7·1 per cent. with laceration of the brain; 1 or 7·1 per cent. of the stomach; 1 or 7·1 per cent. with lacerations of the left lung; 1 or 7·1 per cent. with injuries of both lungs, the heart, the spinal cord, liver, bladder, right kidney, and diaphragm; 1 or 7·1 per cent. with lacerations of the left lung and ruptures of the liver and right kidney; and 1 or 7·1 per cent. with lacerations of the right lung and ruptures of the liver.

170. On the causes of rupture, he remarks :—"Of these 14 ruptures, 13 or 92·8 per cent. were the result of accident and 1 or 7·1 per cent. was homicidal." Causes of rupture of spleen.

171. "In 5 or 38·4 per cent. the cause was falling into the holds of vessels; in 3 or 23 per cent. falls from heights, as from roofs of houses and from off high ladders; in 2 or 15·3 per cent. the injuries resulted from being knocked down by runaway horses; in 2 or 15·3 per cent. persons were crushed by brick buildings falling on them; and in 1 or 7·6 per cent. from being run over by a cart :—this case was that of a boy who fell off the front of a bullock cart, and a wheel of the cart passed over his body." Reasons assigned for accidents.

172. In 11 or 78·5 per cent. external marks of violence were found, and in 3 or 21·4 per cent. they were absent. External marks of violence.

173. "The spleen in 13 or 92·8 per cent. of the cases was diseased and in 1 or 7·1 per cent. was healthy."* Condition of spleen in foregoing cases.

174. Concerning the size of the spleen in Dr. MacKenzie's cases, he remarks :—"In 1 or 7·1 per cent. the spleen was noted as being large; in 3 or 21·4 per cent. no notes were made; in 1 or 7·1 per cent. the size was 11 inches long and 6½ inches broad; in 1 or 7·1 per cent. it was 9½ inches long and 7 inches broad; in 1 or 7·1 per cent. it was 9 inches long and 5 inches broad; in 1 or 7·1 per cent. it was 6 inches long and 4 inches broad; and in 1 or 7·1 per cent. the organ was said to be small."—*Ib.*, p. 81. Size of spleen.

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* MACKENZIE'S *Medico-Legal Experiences in Calcutta*, pp. 80-81.

Nature of ruptures of spleen.

175. "The spleen in 5 or 35·7 per cent. of cases was ruptured into pulp; in 2 or 14·2 per cent. the rupture was through the whole thickness of the organ; in 1 or 7·1 per cent. the ruptures were both deep and superficial; in 1 or 7·1 per cent. they were deep; and in 5 or 35·7 per cent. no records could be found."

Situations of ruptures.

176. The situations of the ruptures of the spleen in these 14 cases were as follows:—"In 2 or 14·2 per cent. they were through the whole thickness of the viscus; in 2 or 14·2 per cent. they were on the inner surface and through the hilus;* in 3 or 21·4 per cent. the inner surface was reduced to pulp; in 1 or 7·1 per cent. the rupture was through the inner surface, the hilus, and the lower end; in 1 or 7·1 per cent. at the inner surface, the hilus, and upper end; in 1 or 7·1 per cent. on the inner surface; in 1 or 7·1 per cent. the inner surface and upper end were ruptured into pulp; in 1 or 7·1 per cent. they were on both surfaces; in 1 or 7·1 per cent. they were confined to the outer surface and anterior margin, and in 1 or 7·1 per cent. the whole spleen was a mass of pulp. In 4 or 28·5 per cent. there were two ruptures; in 5 or 35·7 per cent. the organ was reduced to pulp; in 4 or 28·5 per cent. there was one rupture; and in 1 or 7·1 per cent. there were 5 ruptures."†

Period of survival after rupture of spleen.

177. As to the length of time the persons survived after receipt of rupture of the spleen, the following quotation is interesting:—"In 6 or 42·8 per cent. death was said to have occurred instantaneously; in 2 or 14·2 per cent. within half-an-hour; in 1 or 7·1 per cent. in about an hour; in 1 or 7·1 per cent. in 2 hours and 15 minutes; in 1 or 7·1 per cent. in 5 hours 15 minutes; in 1 or 7·1 per cent. in 6 hours; in 1 or 7·1 per cent. it was reported as having occurred 'shortly after;' and in 1 or 7·1 per cent. no notes could be found."—*Ib.*, pp. 82-83.

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* The *hilus* or *hilum* referred to is the fissure or depression found on the internal or concave surface of the spleen.

† MACKENZIE'S *Medico-Legal Experiences in Calcutta*, p. 81.

178. As to the cause of death, Dr. MacKenzie notes:—"Death resulted from hæmorrhage in 8 or 57·1 per cent. of these cases; from shock in 5 or 35·7 per cent.; and from shock and hæmorrhage combined in 1 or 7·1 per cent." *Causes of death resulting from rupture of spleen.*

179. Dr. MacKenzie states that "92·8 per cent. of the complicated ruptures of the spleen were the result of accidents, and 7·1 per cent. was a homicidal case, and there was not a single case of spontaneous rupture. The accidents which caused these ruptures were of a severe character—71·4 per cent. of the victims having suffered from violence enough to break their bones. The injuries occurred in the persons of natives only, the majority of whom were adult males." *Percentage of causes of complicated ruptures of spleen.*

180. "In all these ruptures in which notes were retained regarding the nature of the injuries, they were found to be of a severe character. As in the non-complicated cases, so in the majority of these, the inner surface of the spleen was injured. As in the other class of injuries of the spleen, more than a single rupture, as well as the spleen being reduced to a state of pulp, were present in the majority of these cases. As found in the other ruptures of the spleen, in most of the complicated (cases) a large quantity of blood was extravasated into the abdominal cavity." *Nature of injuries caused to spleen.*

181. From its size, the liver is one of the most frequently ruptured of the abdominal viscera. Either surface of the organ may be torn, but the upper is more frequently so affected, and an organ that is diseased is more prone to suffer than one of normal texture. Several degrees of rupture are met with, varying from a slight superficial crack to conversion into a complete pulp. The parenchymatous tissue may sometimes be torn while the peritonial covering of the organ is left intact. *Rupture of the liver.*

182. Blows, falls, spent shot taking effect in the hepatic region, wheels of vehicles passing over the abdomen, frac- *Causes of rupture of liver.*

tured ribs perforating the diaphragm* are among the most frequent causes of rupture of the liver.

Symptoms of rupture of liver.

183. As there are none that are strictly diagnostic, the presence of a communicating wound or the performance of laparotomy can alone lead to an accurate estimate. The precise nature of the injury and the region of the abdomen must be considered. Shock, if the rupture be of any extent; is well marked: the general surface of the body is pallid and cold; vomiting, thirst, and general restlessness, sighing respiration, and feeble pulse are present; together with pain and tenderness in the region of the liver, but these latter symptoms are likewise present when the organ is merely bruised. An increase in the faintness and feebleness of the pulse denotes that the hæmorrhage is continuing, and that an accumulation is taking place in the peritoneal cavity, which will be recognised by a gradually widening area of dulness on percussion. If not speedily fatal, jaundice and itching of the skin may supervene. Should an external wound exist, bile may be discharged through it.

Prognosis of rupture of liver.

184. This depends upon the size of the rupture. If it be of any magnitude, death takes place in a few hours from shock and hæmorrhage. Small ruptures may be recovered from, and very superficial cracks may pass undetected. If the immediate dangers be overcome, the subsequent ones that threaten are peritonitis and abscess due to the extravasation of blood and bile. When the serous covering of the organ is not torn, the chances of recovery are enhanced.†

Ruptures of liver most common in Calcutta.

185. Dr. MacKenzie states as follows:—"The ruptures most commonly met with in my experience in Calcutta have been those of the liver. I propose to divide these ruptures into those of the liver only, and those of the liver complicated with ruptures of one or more other organs."

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* The *diaphragm* is the large muscular partition separating the abdominal from the thoracic cavity.

† HEATH'S *Dictionary of Practical Surgery*, Vol. I, pp. 952-953.

186. In 34 or 30·6 per cent. of the cases the ruptures were those of the liver alone.

Ruptures of liver only.

187. Of these 34 cases, 33 or 97·05 per cent. were the result of accident, and only 1 or 2·94 per cent. was a case of homicide.

Statistics of rupture of liver.

188. Fourteen cases were said to have been caused by being knocked down by runaway horses in or outside carriages and by bullock carts; 8 resulted from falls into the holds of ships and boats; 2 resulted from falls on piles of bricks; 1 was that of a man who was knocked down while helping to remove a boiler—the boiler rolled on his back and crushed him to death; 1 was that of a man struck by a tub full of salt, which was being removed from a ship's hold; 1 was that of a coolie or porter, who, while carrying a heavy box on his head, slipped and fell on his back with the box on the front of his chest and abdomen; 1 was that of a man, who, while working on board a ship, was struck by a sling containing three 2-maund bags of *dab;* 1, a drunken man, fell heavily on a hard metal rod; 1, a syce or groom, was kicked over the abdomen by a horse he was grooming; 1, a lad in a fishing boat which collided with a pontoon of the Hooghly Bridge, was precipitated into the river, and either was driven by the current against the pontoon, or against its mooring chains a few yards below the pontoon; 1 was that of a man struck by the handle of a winch in motion.

Causes assigned for accidental cases of rupture of liver.

189. In the 34 cases, the liver was found to be healthy in 6 or 17·6 per cent., diseased in 26 or 76·4 per cent., and no note was found in 2 or 5·8 per cent.

Condition of liver in cases of rupture.

190. Of the 34 cases mentioned, in 16 or 47·05 per cent. the ruptures were deep; in 4 or 11·7 per cent. the whole or the greater portion of the liver was ruptured into pulp; in 2 or 5·8 per cent. the ruptures were both superficial and deep; in 2 or 5·8 per cent. they were superficial only; and in 10 or 29·4 per cent. no notes were kept.

Nature of ruptures of liver.

Position of ruptures of liver.

191. Of the 34 cases, in 6 or 17·6 per cent. the ruptures were on the upper surface of the right lobe; in 3 or 8·8 per cent. they were on the under surface of the right lobe; in 5 or 14·7 per cent. through the whole substance of the right lobe; in 4 or 11·7 per cent. the right lobe was ruptured into pulp; in 3 or 8·8 per cent. the injury was confined to the posterior margin of the right lobe; in 1 or 2·9 per cent. to the anterior margin of the right lobe; in 2 or 5·8 per cent. through the junction of the right and left lobes; in 2 or 5·8 per cent. the ruptures were on both surfaces of the right lobe; in 1 or 2·9 per cent. they were on the posterior margin of the right lobe, and on the under surface of the left lobe; in 1 or 2·9 per cent. on the under surface of the left lobe; in 1 or 2·9 per cent. on both surfaces of the right and left lobes; in 1 or 2·9 per cent. on the anterior margins of the right and left lobes; in 2 or 5·8 per cent. through the whole substance of the right and left lobes; and in 2 or 5·8 per cent. no record was kept.

Size of ruptures of liver.

192. In 11 or 32·3 per cent. of these 34 cases, the length of the ruptures varied from 2¼ to 5 inches; in 4 or 11·7 per cent. they were from 5 to 10 inches long; in 1 or 2·9 per cent. the rupture was 12 inches in length; in 6 or 17·6 per cent. the organ was reduced to a state of pulp; and in 12 or 35·2 per cent. no note was preserved.

Cause of death in cases of rupture of liver.

193. Out of these 34 cases of rupture, in 18 or 52·9 per cent. the cause of death was hæmorrhage, in 15 or 44·1 per cent. death resulted from shock, and in 1 or 2·9 per cent. it was due to shock as well as hæmorrhage. These notes show that the common cause of ruptured liver is accident, and the most frequent cause of these being people knocked down by runaway horses and by bullock carts.

Region where blood was effused from liver.

194. In 32 or 94·1 per cent. of the 34 cases, the effused blood was found in the abdominal cavity; in 1 or 2·9 per cent. in both pleural cavities; and in 1 or 2·9 per cent. into both pleural and abdominal cavities. In the last two cases

mentioned one or more ruptures or injuries of the diaphragm were found.

195. Of the 34 cases, in 6 or 17·6 per cent. death was reported to have occurred instantaneously, in 11 or 32·3 per cent. within an hour, in 4 or 11·7 per cent. in from one to two hours, in 1 or 2·9 per cent. from two to three hours, in 4 or 11·7 per cent. in three to seven hours, in 1 or 2·9 per cent. in three days, and in 7 or 20·5 per cent. the time was not mentioned by the police authorities.

Period of survival after rupture of liver.

196. On these facts Dr. MacKenzie makes the following remarks :—20 per cent. of the cases were accidents on board ships and boats, and 40 per cent. resulted from carriage, tram, or cart accidents. All the European males were sailors, and 50 per cent. of the adult native males were lascars or native seamen; 20 per cent. were native boys, and 1 or 10 per cent. was a girl.

Analysis of causes of rupture of liver.

197. External marks of violence were present in 80 per cent. of the cases and absent only in 20 per cent. The external marks were found in only 25 per cent. of the cases in the hepatic* region, as well as in other parts of the body; while in 75 per cent. these were found in other parts of the body distinct from the hepatic region.

External marks of violence.

198. Bones were found fractured in 80 per cent. of cases, showing that the nature of the accident was of a violent character. In all these cases, ribs were found to have been fractured, and in 37·5 per cent. the ribs as well as other bones were broken.

Fractured bones as complications.

199. The liver was found in 60 per cent. to be diseased, in 30 per cent. it was healthy, and in 10 per cent. no record was kept. From the nature of these ruptures, it will be seen that the liver was, in the 70 per cent. of cases in which notes were kept, found to be seriously and irrecoverably injured.

Diseased liver as complication.

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* The *hepatic* region is the region where the liver is situated.

Ruptures as complication.

200. The ruptures in 70 per cent. of the cases were limited to the right lobe, in 20 per cent. they were found in the right and left lobes, and in 10 per cent. the whole of the liver was ruptured and reduced to pulp.

Hæmorrhage as complication.

201. In half the cases, the persons who received the injuries died from shock, and in the others from hæmorrhage.

Blood in abdominal cavity.

202. Blood was found in the abdominal cavity in 70 per cent. of the cases, in 20 per cent. in the abdominal and pleural cavities, and in 10 per cent. no notes were made.

Quantity of blood extravasated.

203. In 70 per cent. of the cases, the quantity of blood found varied from 8 to 90 ounces, in 20 per cent. it was noted only as a "large quantity," and in 10 per cent. it was not recorded. In the majority of the cases in which the condition of the blood effused was recorded, it was found to be fluid and of a dark colour.

Time between injury and death.

204. In all the cases regarding which notes were found, the persons died within an hour of the receipt of the injury."

Rupture of the bowel.

205. Rupture of some part of the intestine is a tolerably frequent and a very fatal injury. It occurs in any part of the bowel, 'from the commencement of the duodenum* to the termination of the sigmoid flexure† of the colon' (Pollock). The laceration varies in extent, being sometimes little more than a pin-hole, at others involving the whole or almost the whole circumference of the bowel.

Rupture of bowel caused by severe contusion.

206. "The injury is caused by severe contusion, such as the kick of a horse or the passage of a wheel over the abdomen when the intestine is full; for there is no evidence,

* The *duodenum* is the first part of the small intestines, situated just below, but continuous with, the stomach.

† The *sigmoid flexure* is the bend of the colon, or large intestines, continuous with the descending colon above and the rectum below.

as far as I know, that the intestine can be ruptured when collapsed, and this is a very important distinction between rupture from contusion and perforation from direct wound. Many instances of sword and bullet wounds of the intestines have been recorded in which recovery has ensued, though the occurrence of fæcal fistula* has proved the reality of the lesion of the bowel. And such cases are easily intelligible if we suppose that the bowel was empty at the time of the wound, so that no fæcal fluid or gas escaped into the peritoneal cavity at the moment of the perforation. For the mucous membrane protrudes at once through the lips of the wound in the muscular and serous coats, and, assisted by the contraction of the muscular fibres,† so effectually closes the aperture, that no extravasation takes place at the moment of the wound; nor would any extravasation occur at all if renewed distension could be prevented. By the time that the injured bowel becomes distended with fæces, its wounded part has contracted adhesions to the neighbouring coils and to the parietes (or walls), so that the fæces find their way out of the external wound, not into the peritoneal cavity. This protrusion of the mucous coat occurs also in the case of internal rupture. But here, since the bowel is distended when ruptured, and as there is no other exit for the contents except through the wound, there must occur, instantaneously on the rupture, a free escape of fæcal gas at any rate, and in all probability an effusion also of fæcal fluid into the peritoneal cavity, though the latter may sometimes be in such small amount as not to be discoverable after death. Thus, the germs of fatal inflammation‡ are in all probability implanted on the serous membrane, and there is not, as far as I can discover, any perfectly satisfactory proof that complete rupture

* A *fistula* may be defined as a suppurating tube-like passage.

† The *intestines* have for the most part four coats—an *internal* (1), mucous, and (2), sub-mucous; (3) middle or muscular, and (4) external or serous, the latter being derived from the peritoneum.

‡ All the more acute forms of inflammation are considered, at the present day, to be due to the action of certain forms of micrococci.

through all the coats of the bowel without external wound has ever been followed by recovery. At the same time, there have unquestionably been cases in which the symptoms have been held to justify the diagnosis of ruptured bowel which have ended in recovery; and the theoretical possibility of recovery, even in cases of complete rupture, has not been disproved, for we are not entitled to assert that the effusion of fæcal gas must inevitably prove fatal; and there is again the remote possibility that, although the bowel may be ruptured, yet the rupture may not implicate the peritoneum, consequently the injury must be treated with a view to recovery.

Rupture of the intestine.

207. "Rupture of the intestine can generally be diagnosed. After a severe blow on the abdomen, acute pain comes on shortly before the pain of the injury has subsided, often accompanied with much collapse (though not always so), with urgent vomiting, intense thirst, great tenderness of the abdomen, involuntary contraction of the abdominal muscles, usually rapid sinking with coldness of the surface, lividity, and loss of pulse some time before death. As the case goes on, the vomit, which at first consists merely of food, becomes bilious, and then more and more resembles the contents of the small intestines, but I have never seen absolute fæcal vomiting. Tympanites* usually succeeds, probably from paralysis of the bowel—the result of an impression on the sympathetic system of nerves.† The collapse which depends on general shock may, as Mr. Le Gros Clark points out, be distinguished from that caused by hæmorrhage, since in the latter case the patient usually refers his suffering to some isolated spot, where fulness or dulness, on percussion, or both, may be detected."‡

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* *Tympanites*, popularly called "drum-belly," is the distension of the abdominal walls with gas contained in the intestines.

† *The sympathetic system of nerves* is a double chain of little nerve masses, intercommunicating by cross bands of nerve fibres, and situated upon the front of the vertebræ, from the base of the skull to the end of the spinal column. It may be traced into the head.

‡ HOLMES' *Surgery: Its Principles and Practice*, 3rd Edition, p. 208, *et seq.*

208. Dr. MacKenzie states :—"The next in order of frequency, after the rupture of the spleen, I found to be the *rupture of the intestines*. There were 12 ruptures of the intestines; 11 or 91·6 per cent. of these were uncomplicated with injuries to other internal organs, while 1 or 8·3 per cent. was accompanied with two superficial ruptures of the liver. As I did in case of the ruptures of the liver and spleen, I propose to consider these cases also under two heads—those in which the only rupture was that of the intestines, and the case in which it was accompanied with ruptures of the liver.

Rupture of intestines.

209. Of these 11 cases, 10 or 90·9 per cent. were accidental, and 1 or 9 per cent. was homicidal. In 4 or 40 per cent. the persons injured were kicked in the abdomen by horses; in 2 or 20 per cent. persons were struck in the abdomen by pieces of wood; in 1 or 10 per cent. a person was run over by a carriage; in 1 or 10 per cent. it resulted from a fall on a large piece of timber; in 1 or 10 per cent. of the cases a person was jammed between a boat and a pontoon; and in 1 or 10 per cent. a man was crushed between two railway trucks. Ten or 90·9 per cent. were adult native males, and 1 or 9 per cent. was a Eurasian boy. In 2 or 18·1 per cent. the intestines were ruptured in two places, and in 9 or 81·9 per cent. in one. In 3 or 27·2 per cent. fæcal matter and fluid were found in the abdominal cavity; in 2 or 18·1 per cent. fæcal matter and blood; in 2 or 18·1 per. cent. no extravasation had taken place; in 1 or 9 per cent. only blood was found; in 1 or 9 per cent. blood and fluid; in 1 or 9 per cent. fæces, fluid, and blood; and in 1 or 9 per cent. fæces alone.

Analysis of cases of ruptures of intestines.

Nature of substances extravasated into abdominal cavity.

210. One or 9 per cent. died in seven hours; 1 or 9 per cent. in twelve hours; 2 or 18·1 per cent. in twenty-four hours; in 1 or 9 per cent. in twenty-nine hours; 2 or 18·1 per cent. in thirty hours; 1 or 9 per cent. in fifty-eight hours; 1 or 9 per cent. in three days; 1 or 9 per cent. in five days, and 1 or 9 per cent. in eight days.

Length of time deceased survived after the accident.

Cause of death.

211. In 9 or 81·8 per cent. the cause of death was peritonitis, and in 2 or 18·1 per cent. it resulted from shock.

Injuries to the abdomen.

212. *Incised wounds and contusions on the abdomen* are likely to be of a very dangerous nature, owing to the slight protection afforded by the outer covering and the ease with which the vital organs may be affected. A blow on the upper part of the abdomen, "the pit of the stomach," may cause instant death without producing laceration or contusion of any organ. This effect is generally ascribed to concussion of the semi-lunar ganglia* of the sympathetic† nerve. A blow on the abdomen may cause death by rupture of the spleen, of the liver, of the intestines, of the bladder, or of the gall bladder, and leave no external trace whatsoever. Ruptures of the spleen are especially common in this country, where, in feverish parts, nearly one-half of the people have spleens more or less diseased and enlarged. Rupture of the spleen is almost invariably fatal, but the period within which death takes place differs considerably. Sometimes it is instantaneous, and at others it has only followed after a considerable time.

Remarkable case of complicated rupture of liver, spleen and kidney.

213. A very remarkable case is given by Dr. Fayrer, in which a Hindoo was admitted into the hospital with a fracture of the left fore-arm and compound dislocation of the right wrist-joint, caused by a fall from a tree. For the first two days he complained of pain in the hypogastrium‡ and passed bloody urine. These symptoms gradually passed off, and the secretions became normal. The injuries to the arm, however, assumed an unfavourable aspect; tetanus set in, the arm was amputated, and he died sixteen days after the accident. On examination the liver was found

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* The *semi-lunar ganglion* is a group of nerve-cells situated in the upper and back part of the abdominal cavity and supplying nerve influence to the vessels of the organs contained in the abdominal cavity.

† The *sympathetic nerve* here referred to is a double chain of nerve ganglia passing down one on each side of the front of the spinal column.

‡ The region situated at the lowest part of the abdomen, in the middle line.

to be ruptured; there were two ruptures in the spleen, and there was an extensive rupture in the left kidney. And yet with all these injuries the patient, except for the first few days, appeared to suffer no evil effects; and, as far as could be judged, death was caused only by the injuries to the arm. For other remarkable cases of injuries to the spleen and liver, see Chevers, page 460; Taylor, Vol. I, page 667; Casper, Vol. I.

214. *Wounds to the bladder and the gall bladder* generally prove fatal, the latter causing peritonitis. A case is related by Taylor (Vol. I, page 633) of a gentleman who had been prevented, from some cause or other, from retiring to his room, and who felt pain from distension of the bladder. Whilst going downstairs, he accidentally struck his abdomen against some projection. The pain at once passed away, and also the desire to pass urine. He then went out to the house of a friend, where he was engaged to dine. A doctor, one of the guests, to whom he told this, at once suspected that rupture of the bladder had taken place. This proved to be true; the symptoms set in almost immediately, and the gentleman died in three or four hours.

Wounds to the bladder and gall bladder generally prove fatal.

215. *Rupture of the heart* is generally caused by severe compression of the thorax from some heavy body passing over it. It is not infrequently accompanied by rupture of the valves.* Death takes place nearly always directly after such an accident, either from the shock to the system or from blood entering the pericardiac cavity freely, and thus interfering with the heart's action.

Rupture of the heart.

216. Wounds of the heart may result either from an external penetrating agent or from a fractured rib or sternum (or breast-bone). The latter, however, does not take place so frequently as the similar accident in the case of the lung, owing to the better protection of the pericardiac cavity in the chest. Its consequences, on the other hand, are

Wounds of the heart.

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* The *valves of the heart* are infoldings of the lining membrane strengthened by a little fibrous tissue: they serve to prevent the backward flowing of the blood.

much more serious, and for all practical purposes wounds of the heart, whether produced by an external penetrating agent or by fractured bone, may be considered together.

Fatality in cases of wounds and rupture of the heart.

217. The wounds are regarded as necessarily fatal, and though a large proportion of them are so, yet recovery takes place in about 15 per cent. As in rupture of the heart, death takes place either immediately from shock, or from blood entering the cavity of the pericardium and so impeding the contraction of the muscular fibres, or secondarily, from the after consequences of the wound. Thus, death may take place from continued hæmorrhage, either externally or into the surrounding tissue, or it may take place as a result of the acute pericarditis and myocarditis* set up by the injury. The nature of the wound does not appear materially to affect the mortality, nor does the part of the heart wounded. Thus, the average of fatality remains nearly equally distributed amongst punctured, incised, and lacerated wounds, and the same is true whether the right or left auricle† be wounded.

Signs of wound the heart.

218. The signs of a wound of the heart are the fact of a wound existing in its immediate neighbourhood, the occurrence of external hæmorrhage from it, and the signs of internal hæmorrhage, which may take place either into the pericardiac cavity or into one of the mediastinum. The pulse is small, intermittent,‡ and irregular.§ There is often considerable pain over the sternum, and much dyspnœa, though these are not constant. The dyspnœa does not come on immediately, but is generally a later sign in those who live sufficiently long. Auscultation may reveal a friction

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* *Myocarditis* is a term used to sigify inflammation of the actual muscular fibres of the heart itself.

† The heart is divided into four chambers, two *ventricles* and two *auricles*, right and left: the auricles are the smaller and direct the blood to the ventricles.

‡ An *intermittent pulse* is one in which a pulsation is missing at regular or irregular intervals.

§ *Dyspnœa* means difficult breathing.

sound* if the amount of blood in the pericardium be small, but more frequently nothing is audible, the heart sounds being muffled by the surrounding blood.†

219. With regard to the cases of rupture of spleen already referred to, a case was omitted which has been recorded by Dr. Chevers of a soldier who was hit on the left side by a piece of shell, on the day of the final attack upon the Redan. He was suffering from "severe pain in the left side, which was augmented by pressure over a circumscribed place, corresponding to a point a little external to the cartilage of the ninth rib, and not more than three inches in circumference; there was anxiety of countenance and accelerated pulse, but no abrasion of the surface, no fractured rib, no swelling or discolouration of the part." He was treated for the symptoms, and discharged two days after at his own request, and, to all appearance, quite well. He returned to duty, which he performed, as usual, for two days, when he was re-admitted with symptoms of double pleurisy, under which, with pericarditis, he died on the eighteenth day after receiving the blow. The peritoneum, throughout its entire extent, was of an almost perfectly black appearance, as well that of the parietes as that of the intestines; the omentum‡ was likewise black, but in no other respect did the peritoneum differ from its healthy character. It was still glistening, tense, and elastic. The spleen was about three times its ordinary size, ruptured to the extent of two inches in its long axis, and to a considerable depth in its anterior and external aspect. Its substance was infiltrated with congealed and black blood: the vessels were uninjured. There was no fractured rib and no laceration of the parietal peritoneum. Case of rupture of spleen recorded by Chevers.

220. The question, of how long a man can survive and what exertion he is capable of going through after receiving Period of survival in case of rupture of spleen.

* *Friction* is a term here denoting a soft grazing noise of a to and fro character, due to the two layers of the pericardium rubbing against one another.

† HEATH'S *Dictionary of Practical Surgery, Vol. 1*, p. 689.

‡ The *omentum* is a part of the peritoneum forming a sheet-like covering for the intestines.

the injury, may frequently arise in the course of a criminal trial, and once came before Mr. Gribble in the course of a magisterial enquiry into a rather typical case for this country (see Illustrative Case No. XLVIII). There seems to be no doubt that no definite rule can be laid down, and a man with a ruptured spleen might be quite capable of walking and yet eventually die of the rupture.

Mutilation as a punishment.

221. Under Hindoo law, mutilation of every portion of the body is authorized as a punishment for certain offences, for instance, hand or foot, both hands, one hand and one foot, both hands and both feet, buttock, lip, penis, half the penis, testicles, pudenda,* fundament, ears, nose, breaking the teeth, finger or fingers, pulling out the eyes, &c. Mutilation, as a punishment, appears to have been prevalent throughout Asia, and is practised in China to the present day. Amongst the lower classes, cases of mutilation, such as cutting off the nose, the hand or an ear, are by no means uncommon, and occur generally on account of quarrels or jealousy regarding a woman. Gouging the eyes also occurs, and in former days the usual punishment inflicted upon royal princes who were guilty of rebellion was to deprive them of sight by passing a red-hot needle through their eyes. Gholam Khader gouged out the eyes of the Emperor Shah Alam, with his own dagger, and throughout the pages of Indian history numerous instances of this kind of punishment are to be found. Mutilation of the testicles is an exceedingly common offence, but it occurs generally in combination with some other injury, such as strangulation. The testicles are sometimes cut off, but more generally squeezed. In 1870 a case came before Mr. Gribble, as head-assistant magistrate, in which the district moonsiff of Sholinghur was charged with having abetted the torture of a Brahmin boy, who was suspected of having stolen a jewel. Amongst other tortures inflicted to make him confess, it was proved that the sharp-pointed leaf of the date bush was pushed up the urethra, and that

* Those parts of the female generative organs visible externally.

it was likewise used for puncturing the testicles. Considerable injuries were found on these parts by Dr. Silas Scudder, and the moonsiff, together with several others, was committed to the Sessions Court and convicted.

222. It is almost impossible for a medical witness to say whether or not a fracture has been caused by a particular weapon, and very often it is exceedingly difficult to state whether a fracture has been caused by a blow or by an accidental fall. Of course, when there are other attendant signs, he may be able to give an opinion that the fracture was caused by a blow. There are, however, so many cases of severe fractures occurring from falls whilst walking or in falling from a short height, that each case must, to a certain extent, depend upon its own circumstances. The bones vary in brittleness at different ages and in different individuals, and skulls vary much in thickness, being occasionally so thin as to be fractured by a slight blow. With children and with old persons, a slip and fall, whilst walking, is capable of producing a fracture. I have known a family in which three of the children at different times fractured an arm or a leg by a simple fall whilst playing, and I have seen another case in which a gentleman of about thirty years of age fractured his skull by falling down whilst rising from his chair; it is supposed that at the time when he rose he was suddenly seized with an apoplectic fit, but he was in sound health five minutes before the fall. The mere presence of a fracture, without any other suspicious signs, is no proof of criminal violence; it may be due entirely to accident.

Difficulty in defining cause of fracture.

223. All medical jurisprudents agree that it is much more difficult to cause a fracture after death, even a short time after death has occurred, than is the case during lifetime. As soon as death has occurred, the flesh and the muscles lose their elasticity, and it requires much more violence to cause a fracture after than before death. A fracture during life is also generally accompanied by an effusion of blood around the broken parts, and though it is by

Fractures during life and after death.

no means impossible for bleeding to result from a blow caused soon after death, it is not likely. In the case of a fracture, where the parts show no signs of bleeding, there would, however, arise an irresistible presumption that it had been caused after death.

Fractures as affecting locomotion.

224. Mr. Gribble heard it asserted by a medical witness, that a man whose rib has been fractured would not be able to walk a considerable distance afterwards. This, however, depends entirely upon how the rib has been broken, and whether, in its displacement, it has damaged any vital organ. He also met with the case of a gentleman who, in a fall during a steeple-chase, broke a rib, and afterwards remounted and finished the race, and did not find out until the third day that his rib had been broken. Such cases, however, are not by any means uncommon. Dr. Hehir has met with a case of fracture of two ribs as the result of a violent bronchitic cough; and that of an old Indian officer who fractured the neck of the thigh-bone from turning suddenly in bed. There is a case reported in the newspapers of a well-known sporting nobleman in India, who broke his collar-bone at a fall, but continued the race without knowing what had occurred. The mere breaking of a bone, or the dislocation of a joint, unless, of course, in one of the lower limbs, need not necessarily interfere with locomotion. If it occurs during excitement, the injury is sometimes not felt until the excitement has passed over, unless the displacement of the bone directly affects a vital organ.

Gun-shot wounds.

225. These wounds come under the order of contused wounds, but differ from others in the fact that the vitality of the parts struck is destroyed, leading ultimately to sloughing. Casper, whose recorded experience is unrivalled, says that no one such wound resembles another. In one case, we have such a mangling of the countenance, that the body can be no longer thereby recognized; in another, there is nothing to be seen on the body except a small insignificant wound, and that too, in some out-of-the-way part, such as

the axilla* or popliteal region,† and yet both are gun-shot wounds. It is possible to lay down but few generally applicable criteria in regard to such wounds, and according to our experience, these few are the following:—Every gun-shot wound, which is not a mere grazing wound of the skin, is either *perforating* (and we have a wound of entrance and a wound of exit) or it is *penetrating* (and the shot does not pass through, but lodges and makes only one wound). In such cases, it is often a most vain proceeding *to attempt to find* the ball, piece of lead, or shot in the living body, even when such a solid projectile has been employed, which is by no means always the case. Every gun-shot wound has the peculiarity of becoming larger the deeper it goes. This is especially the case in rifle-bullet wounds. Should the ball lodge in any soft part, the cavity in which it is found is often from two to four times the diameter of the wound of entrance.

226. As already remarked, the wound of entrance generally appears to be smaller than the bullet which caused the wound. The text-books generally say that the wound of entrance has its edges inverted and the wound of exit the edges everted, but this Casper affirms to be by no means the case. Projectiles travelling at a low velocity, or which become flattened out or broken up after striking, such as "snider" and express rifle bullets, undoubtedly make an exit much larger than an entrance wound. These appearances will depend greatly upon circumstances, and if the person wounded, or the part struck, be very fat, owing to the protrusion of fat through the wound of entrance, the edges of it will be found anything but inverted.

Gun-shot wounds of entrance.

227. The appearance of a wound from a conical bullet differs greatly from that caused by a round one. A conical bullet causes a trifling, unecchymosed, slightly-contused

Appearance of gun-shot wound from conical or round bullet.

* Or, armpit.

† The region of the "ham" of the leg—behind the knee-joint.

aperture, not always round, often more triangular, from the appearance of which no one would suspect the amount of destruction to be found inside. Should the ball have passed through the body, the aperture of exit is precisely similar; but, just because of these appearances, the greatest caution is recommended in regard to the answers to any queries respecting the apertures of entrance and exit in the case of wounds with conical bullets.

Nature of gun-shot injury depends upon distance from which gun was fired.

228. When the gun has been charged with shot, the nature of the injury depends very much upon the distance the gun was from the body when fired. If from a short distance, the wound often resembles that of a bullet; but in that case the body is certain to show a considerable amount of scorching from the gunpowder. If there is a complete absence of scorching or of powder-branding from the edges of the wound, "we can assume, with some degree of certainty, that the shot came from a distance (more than four feet), and has therefore probably,—or, according to circumstances, with great probability,—been fired by another." But, Casper adds, even in cases of indubitable suicide, he has missed "both of these criteria from the edges of the wounds," so that it is not absolutely certain that, when a person shoots himself, and the weapon is therefore necessarily within four feet of the body, there should be always traces of burn on the edges of the wound.

Gun-shot wound.

229. As regards a body already dead, the same thing has been remarked in the case of gun-shot wounds as has been noticed in the case of blows and fractures. "Bullets, half an inch in diameter," says Casper, "fired from a common pistol against any bone, but particularly against the cheek bone, from a distance of only four or five feet, did not penetrate, but rebounded after contusing the soft parts." A bullet fired against the skull of a corpse remained sticking in the aperture and caused no fissure in the bone, which was of the usual thickness. This is due to the great power of resistance of dead corporeal tissues, "and for this reason, gun-shot wounds, even when pur-

posely produced on dead bodies, can never for one instant be confounded with wounds similarly produced during life." The remarks would scarcely apply to the powerful rifles—Express and Martini-Henri for instance—of the present day. The latter has an initial forward velocity of 1443 feet per second, and an initial velocity of rotation is 744 revolutions per second. At a distance of 25 yards, it is capable of penetrating 14½ elm planks, of half an inch in thickness, placed one behind another, one inch apart.

230. Cases of gun-shot wounds are rare in Indian medical jurisprudence, but when they do occur, the question of premeditation may be settled by the distance from which the shot has been fired. It is manifest that a shot fired from a considerable distance could not have been fired in the heat of a sudden quarrel. It by no means follows that a shot fired from a short distance must necessarily traverse the body. This will depend to a great extent on the weapon, the form of the bullet, the strength of the charge, and the capability of resistance of the part struck. In cases of persons who have committed suicide by putting the pistol into the mouth and firing it off, the bullet has been found lodged in the cranium.

Premeditation defined in case of gun-shot wounds.

231. Dr. Hehir came across a curious and interesting case of suicide by a pistol-shot, in which the patient attempted to "blow out his brains" by placing the mouth of the weapon beneath the chin. He recovered apparently and left the hospital but returned a week later, gradually became comatoze, and died in a few days after the second admission into hospital. At the *post-mortem* examination the bullet was found at the base of the brain. The brain and its membranes were intensely inflamed.

Curious case of suicide by pistol shot.

232. A gun-shot wound in the temple or the mouth is calculated to raise a presumption of suicide, but is not proof of it, for those parts might be selected by a murderer in order to avert suspicion. An interesting case of doubtful murder or suicide in gun-shot wound has already been

Presumption in case of gun-shot wound in temple or mouth.

quoted (No. XXVII) with reference to the point of cadaveric spasm.

Blank charge often causes wound like gun-shot wound.

233. A blank charge, when fired from a short distance (two or three feet), often causes a wound like that of small shot, owing to a number of the grains of the charge being unexploded.

Flash of discharge not unfrequently renders assassin's face distinguishable.

234. There are several cases on record, in which the person shot at has been able, in a dark night, to distinguish the face of the assassin by the flash of the discharge.* A judge in this country, however, would probably be very reluctant to convict on evidence of this kind otherwise unsupported. M. Cauvet (Constantinople), quoted by *Tidy*, concludes an investigation on this point thus :—(1) Recognition of a person firing is possible if the observer be within five paces of the discharge and at the side of the line of fire; or (2) if the discharge occurred in a close place of small dimensions and the observer occupied a stooping posture; (3) recognition is affected by the quality of powder used; the best English powder being that from the explosion of which recognition is most certain. Recognition from an explosion of the coarse powder of this country, which causes a great deal of smoke, would probably be impossible even at a much closer distance, and also, in order to render recognition from an explosion possible, the night must be dark. The more moon or star light, the less perceptible will be the flash.

Cut-throat.

235. *Cut-throat* is the most ordinary method of causing death by violence in this country. The act is generally committed with a bill-hook or sickle, so that frequently the whole of the vessels of the throat and neck are divided. These wounds have been discussed under other heads, but as regards the question of survival with these injuries, see Illustrative Cases Nos. XLIX to LII.

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* Reg. *v.* White, Croydon, 1839—Acquitted.
Reg. *v.* Stapley, Lewes, 1862—Convicted.

ILLUSTRATIVE CASES.

Case No. XLIV.—Injuries to the abdomen causing peritonitis.

There are several instances of blows on the abdomen causing the above-named disease. The following is from Taylor, Vol. I, p. 667 :—A soldier during action was struck by a spent ball on the abdomen over the region of the bladder. The ball fell on the ground at his feet, without either injuring his clothes or even marking his skin. He did not feel much pain at the time, and walked to the hospital, a distance of two miles, with the ball in his pocket, but he died shortly afterwards from peritonitis and inflammation of the bladder. The entire surface of the abdomen presented the appearance of a severe bruise in a few hours after he was struck.

Case No. XLV.—Recovery from an incised wound in the abdomen.

A soldier by accident so fell on his bayonet, that, although the weapon traversed the whole cavity of the abdomen (entering at the back and coming out in front below the navel), the man recovered in six weeks.—(*Taylor*, Vol. I, p. 669).

Case No. XLVI.—Death from a blow on the abdomen.

Chevers quotes a case, in which a man who was said to have been struck with a thick pole on the right loin died immediately. No trace of injury or of grave disease could be discovered on the most careful examination. " I therefore reported that, as blows inflicted upon the front of the abdomen had been known, in several instances, to cause death by a shock to the nervous system, it was probable that, in this case like force applied to the side of the belly had acted in a similar manner.

Case No. XLVII.—The same.—Rupture from a blow or from disease ?

Casper gives the following case :—A Dragoon standing in the street was struck on the right side of the abdomen by the pole of a passing carriage. Three days subsequently he was seized with vomiting and violent pains in the abdomen, and died in nineteen hours, perfectly conscious and with all the symptoms of loss of blood. The medical man in attendance had not observed any trace of injury on the spot where the blow had been received. We found the body in June, already green, etc. ; in the abdominal cavity there was about a pound of decomposed blood and intestinal contents, and the source of this extravasation we found to be in a portion of the small intestine lying on the left side, in which there was situate one of the well-known perforating intestinal ulcers, perfectly circular, three-quarters of an inch in diameter, surrounded by a kind of rampart of tolerably smooth everted edge, which was livid from putrescence. It was perfectly evident that this effusion had been the cause of death; and the history of the case,

and the appearances on dissection, showed also that death had not resulted from the injury received, since it could not have produced such an ulcer, particularly on the opposite side, and if the blow had only completed the perforation of the ulcer, the symptoms which came on subsequently must of necessity have instantaneously presented themselves.

Case No. XLVIII.—What was the cause of death ?

The following very typical case of a mysterious death occurred in Cuddapah in 1879, when Mr. Gribble was acting as district magistrate :—

The tahsildar of S —— had gone to a village to collect arrears of revenue. One of the ryots, on being brought before the tahsildar, was no doubt impertinent. The man seems to have been a quarrelsome fellow, and, the tahsildar said, made a threatening gesture. At all events, the tahsildar struck him with his stick and ordered him to be taken away, and whilst he was in the act of going, gave him a poke with the end of the stick in the *right* side. The man was taken to a tope in the village, and his hands were tied behind his back. Whilst seated on the ground, a gumastah, or clerk, passed by, and saying: What, are you the man who would strike our tahsildar ? kicked him in the right side. The man fell over on his side and exclaimed 'Ayo' ! The man was kept there during the day and ate only a portion of the food brought him. In the evening he was marched off to the subsidiary jail, about ten miles off. On the way he was twice attacked with bleeding from the mouth and nose. The blood from the mouth contained clots. From the time of his arrival in jail he was ill, and refused food. He was groaning constantly, and on the following morning bled from the nose and mouth. For two days more he eat no food. On the fourth day he eat a little rice and pepperwater ; and the fifth day he was insensible, and died on the morning of the sixth day. During this time deceased complained frequently of pain in the right side, breathed hurriedly and with difficulty, did not sleep, and was always moaning. Directly he died, he was buried, and the death was entered in the jail register as one of fever. Just before his death, deceased had a few convulsive twitchings and an evacuation, otherwise he had been constipated. After complaint had been made, the body was exhumed, but was then described as being too decomposed to admit of a *post-mortem* examination. The zillah surgeon, who was present during the enquiry, gave it as his opinion, that deceased had not died from rupture of any internal organ, such as the spleen, liver, or fracture of the rib; but, it being proved that he was a passionate man, had, in the excitement of the altercation, probably ruptured a blood vessel of the lungs, " which accounted for his bringing up blood by the nose and mouth, and subsequent congestion and sub-acute inflammation, and consolidation of the lung, aggravated no doubt by extreme mental anxiety, starvation, and want of proper treatment. The kick on his right side could not, in my opinion, have ruptured his liver ; if it did so, death would follow instantaneously. On the other hand, if it only injured the organ, the subsequet result would have been inflammation, which is

invariably accompanied by jaundice, high temperature, tympanites,* diarrhœa, or obstinate constipation, and other acute and specific symptoms." It was also considered, that if a rib had been broken by the kick or the blow, deceased could not have walked ten miles (*sic*), and if the kick had ruptured the spleen, death would have been instantaneous (?). Under these circumstances, as no Court would, in the face of this medical evidence have convicted of homicide, this charge was not pressed, and the matter was otherwise dealt with. The cases cited here would seem to show that, with the exception of a wound in the spinal cord above the third cervical vertebra† (and of course paralysing the legs), locomotion, even for a considerable distance, is possible with *almost any description of wound.* In this case the body was exhumed about fourteen days after the death, and it is somewhat difficult to understand why the decomposition should have been so considerable as to prevent an autopsy. Of course, in the first instance, all the subordinates had combined to hush the matter up.

Case No. XLIX.—Recovery from cut-throat.

A rather singular case of this kind occurred in Madanapally in 1876. The notes of the case were kindly supplied by Mr. Ward, the medical officer :—

On the 8th April, a man, after killing his wife and another man, attempted to commit suicide. He was found by the medical officer at about 3 A.M. lying on his back on a heap of rubbish, with his throat cut. "There was no hæmorrhage at the time, but he had evidently lost much blood, and was almost pulseless ; he rallied after a while, and was removed to the hospital ; * * * it was found that the larynx had been completely cut across at its upper part, and the pharynx divided, the cut extending so much on each side as almost to expose the main vessels (carotid, &c.). The parts were brought together with silk sutures, and nourishment administered per rectum. * * * . For a few days the case seemed to progress favourably, but it soon became evident that the man was sinking from want of sufficient nourishment and water. * * * . The sutures had cut through, and, except a slight healing and contraction of the wound, generally no

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* Distension of the abdomen produced by flatulence.

† In 1883 a case was tried in October before Mr. C. A. Bird, acting judge of Chittoor, in which a man was found guilty of having killed his brother in a quarrel. Deceased's skull was fractured, and a portion of the brain protruded, and yet he was able to walk upwards of a mile to his house, where he died !

Surgeon-Major Browne related a case that occurred within his experience in Madras, in March 1884. A native stoker was struck by an iron bucket, in which the ashes were being hauled up. The bucket broke loose and after falling about 20 feet struck the man on the upper part of the back of the skull. There was a fracture of the skull, and when brought to the Madras General Hospital there was pus exuding, and broken down brain matter from a wound $2\frac{1}{2} \times \frac{1}{2}$ inches at the junction of the occipital and parietal bones. (The *occipital* bone is situated chiefly at the back part of the skull. The *parietal* bones, two in number, uniting in the middle line from the chief part of the roof of the skull.) The lower part of the skull seemed to have been moved bodily down. The man lay in a very precarious state for more than two months and was supposed to be dying, when he suddenly recovered and was discharged cured on 9th May.

effect was produced. The man was therefore fed through the wound, as attempts to pass a tube through the mouth caused a good deal of irritation. * * *. 3rd July.—Patient is in good condition; operated this morning by freshening the edges of the parts above and below, and brought them together by internal and external sutures; (enemata of milk, eggs and broth); * * *. 9th July.—The sutures have all cut through, but the wound does not gape as much as before. * * *. Attempts to bring the edges of the wound in the larynx together—after the cut in the pharynx had healed—caused much distress; it was only after tracheotomy was performed, and a tube kept in, that the wound in the larynx was partially closed after repeated operations. The man was able to speak with difficulty by closing the opening in his larynx with his fingers. In April 1877, twelve months after the attempt at suicide, he was sent to the sessions court at Cuddapah, where, on 5th May, he was tried and convicted for the double murder. *Sentence*—Transportation for life.

Case No. L.—Recovery from cut-throat.

Chevers* quotes a case in which a man, with the *carotid artery* divided, survived until the following day. "It appeared that a man was aroused in the night by two thieves, who were in the act of stealing in his house. In the struggle which ensued one of them cut him in the neck, and they escaped. After receiving the cut, he said that he had seen the prisoners, whom he named, stealing his *goor*,† that he had seized one of them, and that the other cut him on the neck with a *dhao*, or knife, and both made their escape. The accused not having come with the neighbours, were sent for and confronted with the wounded man, who accused them as above. The man's brother stated that the occurrence happened late at night, and that it was then moonlight. The man died the *following day*. The civil surgeon's evidence was as follows: "I found an irregular deep wound on the neck, apparently caused by a sharp pointed instrument; the wound, in my opinion, was not caused by the man's own hand; the *carotid artery was divided*, and deceased had bled to death." It is to be regretted in this case that it is not recorded whether it was the *external* or the *common* carotid artery that was divided. If it was the latter, Chevers says that this is the only recorded case of so long a survival; but Taylor (ed. of 1883, Vol. I, p. 631) says: "There are several cases on record, which show that wounds involving the common carotid artery and its branches, as well as the internal jugular vein, do not prevent a person from exercising voluntary power, and even running a certain distance, for instance.

Case No. LI.—Recovery from cut-throat.

In 1863, a man committed suicide by cutting his throoat. The external carotid artery and the internal jugular vein‡ on the right side were cut

* *Medical Jurisprudence in India*, p. 427.

† *Goor* or *Jaggery* is the coarse sugar of the bazars.

‡ The *internal jugular veins*, one being situated on each side of the windpipe, are the largest veins in the neck.

through and a large quantity of blood was lost. The wound extended from the front of the angle of the right jaw to near the windpipe, which was not wounded. The man survived half an hour, but was speechless and insensible. (*Taylor*, Vol. I, p. 631.)

Case No.—LII.—Recovery from cut-throat.

In 1831 a woman received a wound whilst in bed, involving the right carotid artery, internal jugular vein, and windpipe. Her body was found in the next room, so that after receiving the wound she had got up from bed and had run about six feet.*

As regards articulation with a cut throat, opinions differ. Chevers quotes a case (p. 426) of a man who spoke incoherently; see also case quoted *ante* p. 105. But note case from *Tellicherry* in March 1885, in which the statement that a man with the carotid artery severed had been able to name the murderer, was not credited. Here again, however, it was not stated which carotid had been divided. It would seem to be certain that whereas a division of the external carotid does not always cause immediate death, a division of the common carotid, almost invariably does so, and certainly prevents all articulation. In connection with this subject, see the remarkable case quoted in the *Pioneer* of 6th February 1890, in which the judge held that a man who had a wound in his throat "three inches long on the right side, being directed downwards and slightly inwards, dividing all the soft structures (muscles, &c.), down to the vertebral column, and both the right carotid artery and the jugular vein and the long nerve cords: it had divided the 4th cervical vertebra, but the spinal cord was uninjured"—could, a considerable time after the wound had been caused, have made a long statement. The deceased's child-wife was accused of having murdered her husband; the jury found her not guilty, but the judge (24-Pergunnahs) differing, submitted the case to the Revisional Bench. It then transpired that the police had suppressed the first information sent to them, and as there was good reason to believe that the alleged deposition was a concoction, the accused was discharged.

Case No. LIII.—Recovery from cut-throat.

In Rex. *v.* Danks (Warwick, 1832), deceased, after receiving a wound, which divided the carotid artery, the principal branches of the external carotid, and the jugular veins, was able to go twenty-three yards and climb over a gate, the time required for such a performance being (as afterwards tested) from fifteen to twenty seconds.—(*Taylor*, *ibid*).

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* For other cases of cut-throat, see—
Reg. *v.* Edmunds, Swansea, Lent, 1863.
Reg. *v.* Cass, Carlisle Sum. Ass., 1860.
Case of Earl of Essex, 1688, found dead in the Tower.
Reg. *v.* Heywood, Liverpool, Wint. Ass., 1855.

CASE No. LIV.—GOUGING OUT THE EYES.

In 1854, a very brutal case was tried at Mangalore, in which the paramour of a married woman, becoming tired of her or jealous, gouged out her eyes with a curved knife and a needle. The woman recovered.—(*Foujdaree Udalut*, 1854.)

CHEVERS gives a case of a man who gouged out both the eyes of his wife with his fingers, and otherwise maltreated her, because she declined to have connection with him, being very young.

IN Macnaghten's Reports (Vol. II, 427), a case is given of a man who, having tied the hands and feet of his wife, threw her down, sat upon her breast, and put out her eyes with a heated iron.

IN the case of bodies found exposed in the fields or jungle, it should be remembered that the *eyes* are generally the parts first attacked by birds of prey.

SECTION II.—DEATHS FROM VIOLENCE, SUICIDAL AND HOMICIDAL.

CHAPTER I.

DROWNING.

Statistics of deaths from violence—Causes of suicides in India—Asphyxia—Drowning—External appearances in cases of drowning—Abrasions and wounds on bodies after death from drowning—Resumé of external appearances of drowned body—Liquid blood in cases of drowning—Internal appearances after death by drowning—The heart after death by drowning—The brain after death by drowning—Abstract of external and internal appearances present in cases of death by drowning—Summary of proofs of death by drowning—Death before submersion—Condition of drowned bodies when examined—Resumé of *post-mortem* appearances in body of drowned—Accidental death and suicides—Mode of death in cases of drowning—Percentage of unmixed asphyxia in cases of drowning—Statistics of suicides and accidental deaths—Mr. Gribble's article in the *Madras Times*—Mr. Gribble's article in the *Madras Times* continued—Mr. Gribble's article in the *Madras Times* continued—Statistics of accidental deaths in Madras—Treatment of the drowned—Method of restoring animal heat—Methods of artificial respiration—Howard's method of artificial respiration—Sylvester's method of artificial respiration—Marshall Hall's method of artificial respiration.

Statistics of deaths from violence.

"IN England about 87·5 per cent. of the deaths from violence (= about ·6 per 1000 of population) are due to accident, the male death-rate from accidental violence being rather more than three times as great as the corresponding female rate. In India, as far as can be gathered from published statistics, the death-rate from accidental violence equals about ·3 to ·4 per 1000 of population, the male rate in most provinces slightly exceed ingthe female rate. In India the most common causes of death from accidental violence are drowning, snake-bite, and injuries inflicted by wild animals. In the Bombay Presidency, for example, in 1883, accidental drowning accounted for about one-third of the total deaths from violence of the year;

and in West Indian Provinces about one-fourth to one-third of the violent deaths occurring yearly are reported as due to snake-bite and wild beasts.*

Causes of suicides in India.

236. Of the causes leading to suicide in India, the following deserve special mention, either from the frequency with which they give rise to cases, or on account of their peculiar character :—

(1) *Grief or shame.*—This is a frequent cause of suicide. Numerous instances are recorded of suicide by wives after quarrels, sometimes trifling in character, with their husbands or their husbands' relatives. Pregnancy following illicit intercourse —a not uncommon result of enforced widowhood —has also in many recorded cases led to suicide from shame and distress and even to homicide. In the case of males, more or less common causes of mental distress leading to suicide are domestic quarrels and pecuniary losses. Instances are also met with of suicide from distress of mind arising from arrest on criminal charges.

(2) *Physical suffering.*—CHEVERS, McLEOD, and others, notice that severe physical, especially abdominal, pain, is a frequent more or less direct cause of suicide, particularly among females.

(3) *Revenge.*—Cases are sometimes met with in which an individual who has been injured by another kills himself under the idea that he thereby throws the responsibility for his death on the person who has injured him. Instances quoted by Chevers show that under the name of *chandi,* this form of suicide was a well known custom among the ancient Rajpoots. A variety of this description of suicide is the practice known as sitting *dharna,* or starving oneself at the door of an enemy or debtor. Again, Chevers mentions a case of a man

* LYON'S *Medical Jurisprudence for India,* 2nd Ed., p. 30.

at Singapore who cut his throat at his neighbour's door in order to get him hanged.

(4) *Religion.*—Self-destruction from religious motives were formerly of somewhat frequent occurrence. One variety of this form of suicide consisted in the individual offering himself as a sacrifice, in order to propitiate one of the Hindu deities, as, for example, by *cutting* himself under the wheels of the car of Juggernauth, or throwing himself in the Ganges. No doubt, also, in some cases of *sati*, or burning of widows on the funeral pile of their husbands, formerly of frequent occurrence in India, the victim was a consenting party.*

237. Under the head of *asphyxia* are included all forms of death in which the act of respiration is primarily arrested, as, for instance, death from drowning, hanging, suffocation, and throttling.† Asphyxia.

238. The cause of death in *Drowning* is the same as that in strangulation, and most of the internal appearances are therefore similar. In cases of drowning, fresh air is prevented from entering the lungs, by the water which has been inspired, and the blood in the lungs becomes imperfectly aërated. There is no longer any supply of oxygen, and the blood circulates in a state unfitted for the preservation of life. The action of the heart becomes gradually weaker until at last it ceases, and then the person asphyxiated dies. The action of the heart, however, often continues for some time after asphyxiation has taken place. It is only after all action of the heart has ceased that recovery becomes impossible. In strangulation the process is exactly Drowning.

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* LYON'S *Medical Jurisprudence for India*, pp. 31, 32.

† The modes of *suicide* most frequently met with are drowning, poisoning, and hanging. In India, as in England, of the deaths from *violence*, the largest number are accidental, the proportion of suicides and homicides being comparatively small, especially the homicides. Suicide *by children* is much more common in India than in England. In 1872, in the Bengal Presidency, of a total of 1,716 suicides, 23 were children; in the Province of Oudh for the 7 years ending 1876, of 4,172 suicides, 46 were children.

the same. The ligature round the throat compressing the trachea or windpipe, prevents the supply of fresh air to the lungs, and death follows in the same manner. In investigating a case of alleged drowning, the following considerations may be of use:—

(*a*) Previous history of persons found in the water,—any alleged suicidal tendency, or any motive that would render suicide probable.

(*b*) Height from which the person fell.

(*c*) Absence or presence of signs of death from drowning.

(*d*) Absence of stakes or other objects in the water that might have caused injuries to any one falling against them.

External appearances in cases of drowning.

239. The "goose skin" or *cutis anserina*, is considered by CASPER to be a sure sign of death by drowning. This appearance, however, is only to be found when the body has been a few hours in the water, and when the inspection takes place immediately after its removal. When this contraction of the skin is found, it is strongly presumptive that the person must have been alive when he entered the water; but it must be remembered, as pointed out by Taylor, that this condition is met with after death from any sudden shock, *e.g.*, after death from hanging. In cases of drowning, the face is pale and calm, with a placid expression; the eyes are half open, the eyelids livid, and the pupils dilated; the mouth closed or half open, the tongue swollen and congested, sometimes marked by the teeth (CHEVERS and GUY say, rarely); and the lips and nostrils are covered with a mucous froth. Casper speaks of a remarkable contraction of the penis in males who have gone into the water living, and states that he has not met with this same condition of that organ after any other form of death.

Abrasions and wounds on bodies after death from drowning.

240. Abrasions and wounds are often found on bodies which have died from drowning. Frequently these marks are the result of accidental injury at the time of immersion

or to injury after immersion. Abrasions may be caused by the person having come in contact with the bottom, or, in the case of wells, by having come in contact with the sides in falling. In the same way, wounds may be caused by any part of the body, especially the head, coming in contact with any hard substance whilst in the act of falling. A body found in the water with a wound on it is naturally calculated to excite a suspicion of violence having been employed, and caution should be exercised before giving an opinion that the wound was caused before immersion. The fact of the edges of the wound having commenced to contract is not necessarily proof that the wound was caused before immersion, because this would be the case if the wound was caused in the act of falling, or at any time before or immediately after death. It will, to a great extent, depend upon the internal appearances as to whether it can be said that the wound was caused before or in the act of immersion. If the internal organs present none of the ordinary appearances of death by drowning, and there is a wound in itself likely to have caused death, it would seem almost certain that the wound had been caused some time before immersion, and that the body was already dead when placed in the water. Of course, in the case of a stab or a gun-shot wound, there could never be any doubt; but the case is different when there is a contused wound, say, of the head, which has produced a fracture in itself likely to have caused death. It often occurs that the hands are found clenched and contain aquatic weeds, gravel, &c. This is a highly suggestive sign that the body came into the water alive; but care should be taken to ascertain whether the weeds are the same as those growing *in* the water, and whether the gravel is the same as that found at the bottom.

Resumé of external appearances of drowned body.

241. The following *resumé* of the external appearances found in the body of the drowned may be read with interest :—

(1) *In the Skin.*—The presence of "goose skin"—*cutis anserina*—is hardly ever absent, even in summer.

The *cutis anserina* is not, however, characteristic of drowning, as it may be present in other forms of violent death, and also in some persons during life. It is a vital act, the result of nervous shock, and does not depend upon the temperature of the water for its production; still it points to recent vitality.

(2) *The Tongue.*—"The tongue is just as often found behind the jaws as between them" (Casper).

(3) *The Hands and Feet.*—The hands and feet acquire a greyish-blue colour when the body has lain in the water from twelve to twenty-four hours. The skin also becomes corrugated in longitudinal folds. The greyish-blue condition of the hand is known as the "cholera hand." The nails may contain particles of sand and weeds. "No corrugation or discoloration of the skin of the hands or feet is ever observed on the body of any one drowned, who has been taken out of the water within half-an-hour, or sometimes even within two, six, or even eight hours." (Casper). The same authority states that he has produced these effects by laying the hands after death in water, or wrapping them in cloths kept constantly wet for some days.

(4) *The Genitals.*—Contraction of the penis is an almost constant symptom, and, as has been stated above, Casper has "not observed anything similar so constantly after any other kind of death." It is due, probably, to the same cause as the *cutis anserina,* which Brettner attributes to "bundles of unstriped muscular fibres, lying in the upper stratum of the true skin, surrounding the sebaceous glands, and forcing them forwards by their contraction, thus making the *cutis anserina*. Precisely similar unstriped muscles

are found in the sub-cutaneous cellular tissue of the penis; they run principally parallel to the long axis of the member, but very often large bundles run across it." The action of cold and fright is to induce contraction of these cutaneous muscles, with a resulting contraction of the penis.

Liquid blood in cases of drowning.

242. A very important point to be observed in deaths by drowning is the liquid character of the blood. This is held by some authors to be almost the only certain sign of death by this cause. This symptom, however, is not invariably found, and all that can be said of it, from a jurisprudent's point of view, is, that its absence, combined with the absence of other symptoms one would expect to find, is calculated to raise a suspicion of death from some other cause.

Internal appearances after death by drowning.

243. The lungs will be generally found greatly distended and filling the whole of the cavity of the chest; they will be flabby in appearance, and an impression made on them by the finger will be preserved, which is owing to their having lost their elasticity from being penetrated by water and they will be three or four times their ordinary weight owing to the same cause. On incision, a bloody, frothy, liquid escapes. The windpipe, *bronchi,** and the minute air tubes of the lungs, will be filled with the same kind of mucous froth, but this appearance is not always met with, and depends probably upon the amount of struggles the deceased went through in his endeavours to breathe. Taylor says: "The presence of mucous froth in the air passages may be regarded as a characteristic of asphyxia by drowning. When discovered in the lungs, associated with a watery condition of these organs, it furnishes a satisfactory proof of this mode of death." If, however, the inspection is not made soon, *i.e.*, two or three hours after death, this froth may entirely disappear. It sometimes

* The two primary tubes into which the windpipe divides.

occurs that the contents of the stomach are found in the windpipe and lungs, which happens when the person has been drowned with a full stomach. Vomiting takes place, and the vomited matters are drawn into the lungs by the attempt to breathe.

The heart after death by drowning.

244. As a general rule, the right cavities of the *heart* are found to contain blood, while the left cavities are either empty, or they contain much less than the right. This, however, is not universally the case. Out of fifty-three inspections made by Ogston, the right cavities were found empty in two cases, and the left cavities empty in fourteen. There are other instances on record in which death was undoubtedly caused by drowning, but in which the right cavities have been found empty or nearly so. CHEVERS paid a great deal of attention to this point, and, after numerous inspections, arrived at the opinion, "that while in many cases the right auricle and ventricle probably contained more blood than is usual, in the generality of instances, where death is not attended with any distinct impediment to the circulation, there were certain hearts in which, quite apart from the effects of decomposition, neither cavity was at all remarkably full; and that there were several in which, the auricle being somewhat distended, the ventricle was well contracted and contained no unusual quantity of blood." Where the inspection takes place several days after death, it is by no means unusual to find the right cavities empty. TAYLOR points out, however, that he cannot call to mind a case where the lungs have been found engorged as a result of asphyxia, and at the same time the cavities of the heart empty. CHEVERS says, "although in many cases of asphyxia the power of the right ventricle is overcome, and its cavity found gorged after death, there is a set of instances in which, the action of the heart continuing after the cessation of respiration, the right ventricle is found well contracted and nearly empty, the lungs being congested in an extreme degree." These facts should be carefully borne in mind by the medical man when in the

witness box, otherwise, after having given it as his opinion that death had been caused by asphyxia, in cross-examination it might be elicited that the right cavity had been found empty, and he might be called upon to explain how he accounted for such a statement, seeing that the generally received opinion is, that in death by asphyxia, the right ventricle of the heart is more or less gorged with blood. He should also remember that the mere fact of the inspection having taken place many hours after death is in itself sufficient to account for the empty state of the heart. For a very remarkable case of mistaken asphyxia, see Illustrative Case No. LV.

The brain after death by drowning.

245. The *brain* is generally found gorged and congested in cases of death by drowning; but this also is not the invariable rule, and TAYLOR points out that the same degree of congestion is observed, not only in other cases of asphyxia, but also in the inspection of bodies where death has proceeded from various causes unconnected with cerebral disturbance. In the case of adult females, SEMPLE found the cerebral vessels nearly empty (CHEVERS). In bodies found drowned, the vertebræ of the neck are often fractured, which may be the result of violence previous to immersion; but CHEVERS speaks of two unmistakeable cases which came within his experience, in which soldiers taking 'headers' in shallow water struck the bottom and broke their necks. HEHIR met with three similar instances.

Abstract of external and internal appearances present in 305 cases of death by drowning.

246. We would here insert an abstract from Dr. MacKenzie's book regarding the principal external and internal appearances met with in his 305 cases:—

I.—EXTERNAL APPEARANCES:—

(1) *Mud, sand, and weeds.*—Of the 305 cases, in 155 or 50·81 per cent., sand, mud, and weeds were found on the bodies.

(2) *Mud under nails.*—In 43 cases notes were taken regarding the presence of mud, or dirt under the nails, and of these in 21 or 48·83 per cent. it was found. The natives

of India, however, cut their nails (unless they have taken a vow not to do so) to the quick, and hence in almost all their bodies this appearance was absent.

(3) *Retraction of the penis.*—In 28 cases in which notes were made regarding this condition, in 16 or 57·14 per cent. the penis was found retracted.

II.—INTERNAL APPEARANCES :—

(1) *Condition of the lungs.*—Of the 305 cases of drowning under consideration, 278 or 91·1 per cent. were congested, 5 or 1·6 per cent. were healthy, and in 22 or 7·2 per cent. I was unable to find any note regarding this condition.

(2) *Position of the lungs.*—Of the 305 cases of drowning, in 41 or 13·4 per cent. the lungs were large, overlapped the heart, and were boggy to the touch ; in 6 or 1·9 per cent. they were large and spongy to the touch ; in 18 or 5·9 per cent. they were large ; in 12 or 3·9 per cent. the lungs filled half the pleural cavities ; in 5·5 or 1·8 per cent. they were collapsed, and 173 or 56·7 per cent. no notes were kept.

(3) *Contents of the bronchi and air-cells of the lungs.*—In 282 or 92·4 per cent. frothy sanguinous fluid was found in the bronchi and air-cells of the lungs ; in 1 or ·3 per cent., in addition to the fluid, mud was ascertained to be present in the pulmonary bronchi and air-cells ; and in 22 or 7·2 per cent. no note was made.

(4) *Heart.*—Of the 285 cases noted, in 142 or 49·82 per cent. dark fluid blood was found in the right side of the heart only ; in 1 case or ·35 per cent. it was found in only the left side of this organ ; in 17 or 5·95 per cent. in both sides of the heart, but more in the right than in the left side ; in 125 or 43·85 per cent. the heart was empty owing to putrefaction, but in these cases the endocardium of the right side of the heart was stained a dark colour, showing that blood had been there, but had been expelled by the gases of putrefaction.

(5) *Condition of the stomach.*—In these 305 cases of drowning, in 281 or 92·1 per cent. this viscus was found to be healthy ; in 5 or 1·6 per cent. it was congested ; and in 19 or 6·2 per cent. no note could be found.

(6) *Contents of the stomach.*—Of these 305 cases, in 131 or 42·9 per cent. the stomach contained food; in 51 or 16·7 per cent. fluid ; in 11 or 3·6 per cent. both food and fluid; in 3 or ·9 per cent. weeds as well as fluid were present; in 2 or ·6 per cent. mud as well as fluid ; in 2 or ·6 per cent. only mud; in 69 or 22·6 per cent it was empty, and in 36 or 11·8 per cent. no notes were kept.

(7) *Condition of the small intestines.*—In these 305 cases of drowning, in 260 or 85·2 per cent. the small intestines were found to be healthy; in 18 or 5·9 per cent. they were congested; and in 27 or 8·8 no notes were kept.

(8) *Contents of the small intestines.*—In 99 or 32·4 per cent. they contained fæces ; in 97 or 31·8 per cent. they were empty; in 27 or 8·8 per cent. they contained fluid ; in 11 or 3·6 per cent. bile ; in 7 or 2·2 per cent. round worms; in 4 or 1·3 per cent. undigested food; in 1 or ·3 per cent. mud ; in 1 or ·3 per cent. they contained fluid as well as round worms, and in 58 or 19 per cent. no notes were made.

(9) *Condition of the large intestines.*—In 272 or 89·1 per cent. they were healthy ; 5 or 1·6 per cent. they were congested, and in 28 or 9·1 per cent. no notes were taken.

(10) *Contents of the large intestines.*—In 197 or 64·5 per cent. they contained fæces; in 3 or ·9 per cent. fluid; in 1 or ·3 per cent. fluid as well as undigested food; in 1 or ·3 per cent. mud; in 40 or 13·1 per cent. they were empty, and in 63 or 20·6 per cent. no notes were retained.

(11) *Bladder.*—In 229 cases notes were kept regarding this viscus and in 227 or 99·1 per cent. it was found to be healthy and in 2 or ·8 per cent. it was found to be congested.

(12) *Brain.*—Notes were retained in 290 cases, in 157 or 54·13 per cent. this organ was decomposed or pulpy from putrefaction; in 110 or 37·93 per cent. it was normal; in 21 or 7·24 per cent. it was soft from putrefaction, and in 2 or ·6 per cent. the brain was found to be congested.

(13) *Vessels of the brain.*—Of 282 subjects in which notes were made 268 or 95 per cent. they were found to be congested; in 13 or 4·6 per cent. they were normal; and in 1 case or ·3 per cent. there was also extravasation of fluid blood over the surface of the brain.

(14) *Condition of the œsophagus.*—Notes were retained in 65 cases, in 60 or 92·3 per cent. it was found to be healthy, and in 5 or 7·6 per cent. it was congested

(15) *Contents of the œsophagus.*—Of the 65 cases, in 1 or 1·5 per cent. mud was present; in 1 or 1·5 per cent. grass; in 1 or 1·5 per cent. food; in 38 or 58·4 per cent. it was empty, and in 24 or 36·9 per cent. no notes were kept.

(16) *Condition of the larynx, trachea, and bronchi.*—Of the 305 cases in 80 or 26·2 per cent. their mucous membranes were congested; in 8 or 2·6 per cent. they were healthy; and in 217 or 71·1 per cent. no notes were kept.

(17) *Contents of the larynx, trachea, and bronchi.*—Of the 305 cases in 26 or 8 5 per cent. frothy mucus was found; in 9 or 2·9 per cent. mud was present; in 1 or ·3 per cent. mud and straw; in 4 or 1·3 per cent. fluid was found; in 1 or ·3 per cent. mud and frothy mucus were present; in 2 or ·6 per cent. food from the stomach had passed into the air passages; in 19 or 6·2 per cent. they were empty."

Summary of proofs of death by drowning.

247. To sum up, TAYLOR states that the internal appearances upon which medical jurists chiefly rely as proofs of death from drowning, are—first, water in the stomach; and, secondly, water with a mucous froth in the air passages and lungs. As regards water in the stomach, Chevers very rightly points out that its presence may be due to the deceased having drunk water shortly before he met his

death. If the water is salt, and the body is found in salt water, this would not apply; or, if the water is of a peculiar kind, or contains weeds of the same kind as grow in the water where it was found, the presumption would be almost irresistible that the person had died from drowning. In the case of a body found in a well or tank of fresh water with only water in the stomach of a moderate quantity, say, one pint, it by no means follows that death was caused by drowning. Water in the stomach, *together with* the mucous froth in the air passages and lungs, seems to be the only certain test; or, in the absence of water in the stomach, the mucous froth alone might be sufficient to cause a very strong presumption. The quantity of blood in the right ventricle of the heart varies so much, that absolute reliance cannot be placed upon any opinion formed from the absence or presence of blood. The same may be said of the brain; and suffusion* of blood on the brain may have been caused by apoplexy, under the influence of which the deceased may have fallen into the water. As regards water in the lungs, a case is recorded of a boy who died from drowning, in which none of the visible signs commonly attributed to drowning were found, and there was no congestion of any of the viscera. As regards the mucous froth, it must be remembered, that, owing to exposure after having been taken out of the water, or owing to the incautious manner in which the body was handled, as, for instance, with the head downwards, liquid passing out of the lungs may have removed it. As regards external symptoms, great care should be taken in observing the hands when the body is removed, because the fact of their being clenched and containing grass, weeds, or sand, may prove conclusively that the death occurred after submersion, if, as before remarked, such grass, weeds, etc., are similar to those found in the water.

248. In the case of death before submersion, it is very rarely that water finds its way into the stomach after the — Death before submersion.

* *Suffusion* is a term signifying a spreading or flow of any fluid of the body into the surrounding tissue.

body has been placed in the water, but the absence of water from the stomach is not conclusive that death occurred prior to submersion. If, after submersion, the drowning man does not rise to the surface, it is exceedingly probable that little or no water will be found in the stomach. The water is swallowed when the person rises to the surface and gasps for air, but if asphyxiation takes place below the surface, it is quite possible that no water will be swallowed, since with asphyxiation the power of swallowing ceases. This has been ascertained from experiments made upon animals.

Condition of drowned bodies when examined.

249. Of Dr. MacKenzie's 305 cases, in 138 or 45·28 per cent. putrefaction was present; in 5 or 1·63 per cent. the bodies were saponified; in 124 or 40·65 per cent. the bodies were fresh, and in the remaining 38 or 12·45 per cent. no note was made as to their condition.

Resumé of *post-mortem* appearances in body of drowned.

250. The following is a resumé of the internal *post-mortem* appearances met with in the body of the drowned :—

(1) *The Brain.*—Cerebral hyperæmia is *most* rare in the drowned, but cerebral hypostasis* is not infrequently mistaken for it.

(2) *The Trachea.*—The mucous membrane of the trachea and larynx is always more or less injected,† and is of a cinnabar-red, which must not be mistaken for the dirty brownish-red colour, the result of putrefaction. A white froth, but seldom bloody, is also found in varying quantity in the trachea, and is a most important sign of vital reaction, but its diagnostic value is destroyed by putrefaction. Sometimes a portion of the contents of the stomach may be found in the trachea. When this occurs it is due to the act of coughing, induced by the admission of water into the lungs. The contents of the stomach are forced into the mouth, and then drawn into the lungs during the next

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* *Vide* ante, p. 5.

† *Injected* here means engorged with blood.

attempt at inspiration. This indicates that the person entered the water during life. In cases where death has taken place from syncope, little or no froth may be found in the trachea.

(3) *The Lungs.*—The lungs are completely distended, almost entirely overlapping the heart, and pressing close to the ribs. They are spongy to the feel, and when cut into, a considerable quantity of bloody froth escapes. The *froth* found in the lungs is the result of the powerful attempts to breathe, and cannot be produced by artificial means. It adheres not to the sides of the bronchial tubes, as does the exudation of bronchitis or pneumonia. The distension of the lungs is due partly to an actual hyperæmia, partly to inhaled fluid, and partly to hyperæmia.

(4) *The heart and great vessels.*—As is common to other forms of asphyxia, the left side of the heart is entirely, or almost entirely, empty, the right, on the contrary, is engorged. This condition of the heart is, therefore, not a diagnostic sign of drowning, and is absent in the drowned when death takes place by neuro-paralysis;* in fact, in some cases of undoubted drowning, both sides have been found empty, probably, however, the result of putrefaction (*Ogston*). The same may be said of the accompanying congestion of the pulmonary artery.

(5) *The Blood.*—As is common in all forms of death where respiration has been arrested, the blood is found to be remarkably *fluid*, and of a cherry-juice colour. M. Faure, in his monograph on asphyxia, states that he has found large and firm clots in the right side of the heart in the drowned who have not remained long under water.

(6) *The Stomach.*—Casper considers that the presence of fluid in the stomach, corresponding to that in which the body is found, is '*an irrefragable proof of the actual occurrence of death from drowning,*' and that the swallowing of it

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* *Neuro-paralysis* here signifies paralysis due to sudden cessation of functions of the vital nerve centres.

must have been a vital act of the individual dying in the water.

N.B.—Putrefaction in the drowned in most cases commences in the upper part of the body, and extends downwards. The face, head, and neck are first attacked. This is the reverse of putrefaction in air.*

Accidental deaths and suicides.

251. The greater number of deaths by drowning occur amongst women, with whom it is a favourite form of suicide, especially in Madras and Bombay. This predilection, however, is only natural, since they are the persons who draw water. It is also only to be expected, considering the extremely dangerous manner in which women and young girls are to be seen every day standing poised on two outjutting stones, and pulling up a heavy chatty or other utensil of water from a well, that there should be many accidents; but still, allowing for all this, there is little doubt that a great number of these reported accidental deaths and suicides are in reality murders. It would be a good thing if district magistrates were to issue an order that every case of accidental death or suicide should be sent into the nearest hospital for *post-mortem* examination. The following hint may be of value to village and police officers, whose duty it is to conduct the first local examinations. When a female deliberately commits suicide, she generally takes one end of her cloth, and, passing it between her legs, tucks the end into the part round her waist behind. This is done from feelings of modesty, lest when the body is found and taken out, her person should be exposed. At the same time, it would be dangerous to lay down any rule with reference to the presence or absence of this sign. It might, however, serve as a clue for further enquiries. It is not unfrequent in Northern India to find that suicides have attached weights to their bodies before jumping into the water. Chevers mentions several such cases. When bodies are found tied hands and feet, or when a heavy weight is attached, a suspicion at once arises that death is due to

* HUSBAND'S *Medical Police.*

violence of a homicidal nature rather than to suicide. But even in this case no rule can be laid down, because there are two recorded cases of indubitable suicide, in which the deceased, one of whom was a good swimmer, themselves tied their hands and feet so as to insure speedy death. In a case of this kind, the first thing that should be done is to examine whether the knots could have possibly been tied by the deceased's teeth. As regards many of the symptoms of drowning, it may be said that it is almost impossible to lay down a hard and fast rule regarding any one of them. The great thing to be ascertained is, whether the death was caused by, or previous to, the immersion.

Percentage of unmixed asphyxia in cases of drowning.

252. Devergie, whose experience in cases of drowning is very large, says that the cases of unmixed asphyxia are as two in eight (25 per cent.); the cases in which no traces of asphyxia exist, as one in eight (12½ per cent.); and the mixed cases as five in eight (62½ per cent.) In cases of pure asphyxia, death has been caused by immersion only; in cases where there are no traces of asphyxia, death must have been caused previous to immersion; but even these cases may not be due to criminal violence. A person might be seized with apoplexy and tumble into the water dead, or a person accidentally falling into a well from a height might fracture his skull so as to cause instantaneous death before he reached the water. These cases are rare, and it may be safely said that when a body is found in a well, with no traces of asphyxia, a very grave suspicion arises of murder having been committed. In the remaining 62½ per cent. of cases, the causes of death are due partly to asphyxia and partly to other causes, such as disease or injuries. The body of a person who had fallen into the water in a fit, would probably show traces of both apoplexy and drowning, and, in the same way, a person injuring himself in the act of falling, would probably die, not only from the injuries received, but also from asphyxia. Where injuries are found, it should be carefully noted whether such injuries could have been caused in the fall. As regards the attacks

of fishes and crabs on a dead body, European authorities state that they seldom attack a body until decomposition has set in; but CHEVERS asserts the contrary. Careful notes should be taken of such marks, for in a certain case in which the ear was missing on a body found in a well, it was urged at the trial that this might have been bitten off by crabs, etc. The medical man had omitted to take any notes of the appearance of the edges of the wound, so that it was impossible to arrive at any decision on this point.

Mode of death in cases of drowning.

253. As to the mode of death in Dr. MacKenzie's 305 cases, 297 or 97·37 per cent. persons died from asphyxia; 1 or ·32 per cent. from syncope; 1 or ·32 per cent. from asphyxia and apoplexy, and in 6 or 1·96 per cent. the mode of death could not be ascertained, on account of the bodies being in a very advanced state of putrefaction.

Causes assigned for drowning.

254. The causes given by the authorities for the immersion of these persons were :—2·31 or 75·73 per cent. were cases of accident; 8 or 2·62 per cent. were cases of suicide; 1 or ·32 per cent. was a case of murder; 65 or 21·31 per cent. the police were unable to assign any cause."

Causes of suicide.

255. The reasons assigned for the eight cases of suicide were :—family disputes, 4; insanity, 2; and bodily diseases, 2.

Where drowned.

256. These 305 persons were drowned in the following places :—198 or 64·92 per cent. in the river Hooghly; 88 or 28·85 per cent. in tanks; 11 or 3·66 per cent. in wells; 4 or 1·31 per cent. were children drowned in cisterns; 3 or ·98 per cent. in the ditch or moat around Fort William. These latter were European soldiers; 1 or ·32 per cent., a child drowned accidently in a tub of water.

Those drowned in the river Hooghly.

257. "If there is no obstacle to impede the rising of bodies, they generally float in the hot and rainy seasons in

the river Hooghly in or within 24 hours after immersion and in the cold season in from 2 to 3 days."

258. Whilst the first edition of this book was passing through the Press, Mr. Gribble wrote the following article for the *Madras Times* with reference to the subject of accidental deaths. It is reprinted here by the kind permission of the Editor :— Statistics of suicides and accidental deaths.

259. "During the year 1883, there were in this* Presidency 1,105 cases of suicide by drowning; 5,880 accidental deaths from drowning; and 2,318 deaths from snake bite and wild beasts. These figures give a total of 9,303 deaths. It is stated in the Administration Report for 1882-83, that the loss of life from wild animals was 139, and as this appears to be the average annual number, it may be fairly assumed that at least 2,160 of the deaths were reported as having occurred from snake bite. In 1883 the total number of deaths was 541,930, so one death in every 58 occurred from suicide, accidental drowning, or snake bite. Now snake bite is a cause of death, which it is very easy to assign, and, as probably in 9 cases out of 10, the body is not sent for medical examination, it is not possible to disprove it. If, however, snake bites are excluded from the calculation, there were 6,985 deaths from drowning alone, either accidental or suicidal, or one death in every 77 was reported as having happened from one of these two causes. It seems almost incredible that so large a proportion of deaths should be due to these causes only. On examining the figures of drowning more closely, it appears that out of the accidental deaths from drowning amongst adults, the proportion of females to males is as 3 to 2; amongst children, the proportion of females to males is about equal, the males being somewhat in excess; again, by dividing the deaths between adults and children, almost one-half of the deaths are found to be of children. That the proportion of females is greater than males can be understood, because females are principally employed in drawing water from unfenced wells, and Mr. Gribble's article in the *Madras Times*.

* Madras.

the excess amount, or about 600, is probably due to this cause. But why is it that the remainder, *viz.*, about 1,000 of each sex are accidentally drowned, and why is it that there are so many children drowned, who certainly are not so much employed in drawing water as adults? There is reason to fear that a large proportion of these reported accidental drownings and deaths from snake bite are in reality murders. Dr. Chevers, in his work on medical jurisprudence, says: 'The latter gentleman (Mr. Alexander) informed me that when he first went to Chumparun, he was astonished at the number of persons reported daily to have died from drowning. The persons so dying were principally women and female children. It struck him as suspicious that so many should be carried off daily in this manner. He therefore issued positive orders that all bodies should be brought in for *post-mortem* examination; upon this, the reports decreased wonderfully. He believed that many of the persons reported to have died in this manner had been made away with.' In another place he also mentions that a police superintendent having adopted the same tactics in two different districts, it was found that a large proportion of deaths reported to be accidental were, on examination, found to be murders, and convictions were subsequently obtained.* A general order of this kind seems to be required in this Presidency. Ten years ago it would probably have been impossible to carry such an order out, but now that dispensaries are being established in almost every taluq town, it is feasible, for there is, generally speaking, a medical man within fifteen to twenty miles of every village. At present, it is left entirely to the village punchayets to decide as to the cause of death. These punchayets are formed of ignorant villagers, many of whom may be, perhaps, interested in hushing up what is the result of domestic quarrels. In 1862, Native Surgeon Ruthnum Moodelly

* In the one district seventy-seven prisoners were subsequently charged with murder of thirty-seven persons, whose deaths had been reported as accidental; and in the other, out of fifteen deaths reported as accidental, ten were proved to be murders!

wrote as follows in the *Madras Quarterly Journal of Medical Science* regarding punchayets :—'They perform their temporary duty very reluctantly, pay no attention to the proceedings at the inquest, and are glad to get rid of a vexatious task by finding any verdict they please.' If there is no medical opinion available, the proceedings are often made use of to extort money. If a crime has occurred, the guilty parties probably have to pay smartly for hushing it up, and the profits are shared by the police and the village magistrates. Mr. Malabari, in his recent eloquent appeal regarding the re-marriage of widows, points out how often the career of a virgin widow ends in shame and crime, and it is to be feared that many a domestic scandal is hushed up by the 'accidental' death of the guilty party. Truth, it is said, is at the bottom of a well, and if she would only reveal the secrets she sees down there, the curtain would be raised from over many a tragedy.

Mr. Gribble's article in the *Madras Times*—continued.

260. "From the last Administration Report, however, we gather that the actual loss of life from wild beasts was only 139. In calculating the number of snake bites for the districts, we have therefore allowed an average of 100 to each of 19 districts. Madras city and the Nilgiris we have omitted, as the circumstances there are exceptional, and Bellary and Anantapoor are taken together. Adding, therefore, 100 on account of snake bites to the accidental deaths and suicides by drowning only, we arrive at some very surprising results. The districts seem to fall into three groups. In the first of these are Vizagapatam, Nellore, Cuddapah, and North Arcot; and in these districts one death in every 30, 30, 33, and 40 respectively, has been ascribed to one of these three causes. In the next group there are ten districts, *viz.*, Ganjam, Godaveri, Kristna, Bellary, Chingleput, Madura, Canara, Salem, Coimbatore, and Kurnool, where the deaths from these causes range from 1 in 47 to 1 in 56. In the last group there are only five districts, *viz.*, S. Arcot, Tanjore, Trichinopoly, Tinnevelly, and Malabar, where the proportion of deaths from these causes varies from 1 in 64

to 1 in 128 of the total deaths from all causes. Now, it is rather remarkable to notice from these figures that in those districts which most abound in water and wells, the deaths from drowning are of less frequent occurrence than in the inland districts. As regards snakes, we fancy that in reality pretty nearly every district is the same, but we find a very remarkable difference in the figures reported. Unfortunately, deaths from wild beasts are lumped together with snake bite, though probably in some districts, such as Chingleput, Tanjore, and Trichinopoly, there are very few deaths from wild beasts. In Chingleput 95 deaths are reported, in Tanjore 185, and in Trichinopoly 169, whilst in S. Arcot there are no less than 200. In Ganjam, Vizagapatam, and the Godaveri, where there should be a large number of snakes and wild animals, only 68, 67, and 87 deaths from this cause are reported. In Cuddapah there were 132, and in the neighbouring district of Bellary there were, over a larger extent of country, with about the same population, only 73 deaths. The difference between Cuddapah and Bellary, as regards deaths from drowning and suicides, is also remarkable, when it is remembered that the circumstances of both districts are very similar. In Cuddapah, in 1883, there were 382 accidental and 89 suicidal deaths, whilst in Bellary there were only 240 and 70, respectively. In every district the accidental deaths are greatly in excess of the suicides; but it is remarkable, that in the thickly populated districts the suicides are far less than in the poorer ones, where the population is thinner. Thus, in Tanjore, there were only 4 suicides, but 249 accidental deaths from drowning; in South Arcot, 21 and 294; in Trichinopoly, 12 and 246; and in Malabar, 16 and 386, respectively. The highest number of suicides is reported from the Godaveri, Kistna, and Coimbatore districts, where there were 122, 107, and 106. Another strange thing is, that whereas in most districts the figures are pretty nearly the same one year after another, in others there are most extraordinary variations. For instance, in North Arcot there were, in 1882, no less than 641 accidental deaths from

drowning, whilst in the following year there were only 528. In Coimbatore, on the other hand, there were 368 deaths from the same cause in 1882, but 436 in the next year.

261. "When the figures of the up-country districts are compared with those of Madras city, we again find some striking differences. Whereas in Madras the proportion of accidents and suicides to the population is at the ratio of 1 in 8282, in almost all the districts the average ratio is far greater. Tanjore alone is somewhat better than Madras, the ratio there being 1 in 8420. Ganjam comes next with 1 in 7776; but we cannot help suspecting there must be something wrong in the reports of this district, for all the rest are far behind. The worst is Cuddapah with 1 in 2167, and Nellore and Coimbatore come next. These figures go to show that there is grave reason for supposing that a large number of the reported accidental deaths, suicides, and snake-bites are in reality homicides. Steps should be taken to sift this question thoroughly."

Mr. Gribble's article in the *Madras Times*—concluded.

The following remarks from *The Lancet* on the increase of suicide may be interesting.

262. "There seems no doubt that a notable increase of cases of suicide is in progress among civilised nations. Comparative statistics are hard to obtain, and are often open to question, but that the present century has witnessed a steadily increasing proclivity to suicide in Europe seems indisputable. A recent writer computes the suicides of Europe at 60,000 annually, and believes that while this number represents the recognised cases of suicide, we should require to double it in order to reach the true figure, and to include secret or unrecognised cases. Germany affords the largest relative proportion of cases, France and England follow next in this order, while Spain, Ireland, and Portugal are very little given to suicide. The Sclavonic race is the least suicidal in Europe. As a general rule, suicide is relatively more frequent among the civilised

The Lancet on increase of suicide.

and cultured than among the ignorant and barbarous. The list of notable suicides is a long one, and includes men in the very front rank of literature, science, art, politics, and war.

Cases of suicide.

263. "The causes of suicide are numerous and obscure. Probably no question opens up more diverse or more abstruse problems in sociology than the inquiry into the reasons that tend to make men weary of life. Racial idiosyncrasy (itself a very obscure subject, and capable no doubt of further analysis), degree and quality of the civilisation attained, type of intellectual development, religion, the severity of the struggle for existence, disease—all these play their part in determining whether a larger or a smaller proportion of persons of unstable brains will elect, "to bear the ills they have" or "fly to others that they know not of." Alcoholism is alleged to be the chief obvious cause of suicide in Northern Europe; but before we can admit this doctrine we should require to investigate the causes of alcoholism itself, to determine how far it is itself a symptom of nervous instability, or an index of misery, over-pressure, or boredom. No error in sociological inquiry has been more widespread or pernicious than the tendency to accept alcoholism as an ultimate fact, requiring no further explanation or analysis, and to trace to the fact of alcoholism all the deplorable evils which follow in its train, without regard to the pre-disposing causes or the associated conditions. The same hereditary or racial peculiarities that incline one individual to alcoholism *minus* suicide may incline another to alcoholism *plus* suicide.

Effects of destitution on suicide.

264. "It is very striking that absolute want and destitution do not seem to be frequent causes of suicide. The abjectly poor and the utterly ignorant do not in any considerable numbers seek to terminate their misery by self-destruction. To incline to suicide there would seem to be required a sharp disparity between either the present and the past social condition of the individual or between his desires and his attainments. The hereditary or chronic

pauper, however miserable his state, rarely thinks of violently terminating his sufferings, probably because he has become accustomed to them, or has only a vague realisation of the difference between what is and what might be. On the other hand the man who has fallen from comfort and social consideration to utter need is in danger, because he vividly realises the contrast between the present and the past. Somewhat parallel is the fact that it is the more intellectually gifted races that are most prone to seek refuge in suicide. The intellectual German or the sprightly Frenchman incline to self-destruction, whereas the phlegmatic Slav has no such inclination. It is in this connection that the very unwelcome fact of the tendency of education and culture to increase the proclivity to suicide finds its explanation. Education, while immeasurably increasing the usefulness and enlarging the enjoyments of the individual, also multiplies his wants, and if those wants cannot be reasonably satisfied, irritation and unrest ensue and may pre-dispose to suicide. We must recognise this fact, and it need occasion no surprise. The man whose mind has expanded by science, art, or letters cannot be satisfied by ignorant Hodge with a hunk of bread and cheese, a pipe, and a quart pot. The former has aspirations which cannot be stifled without danger, and the gratification of which may be beneficial not only to himself, but to his fellows. The enormous benefit of education is that the new wants which it creates are in the main intellectual, and that their legitimate satisfaction tends to wean the individual from the gratification of the senses. The conclusion to be drawn is not that the perils of education outweigh or even seriously detract from its advantages, but that as education spreads adequate provision must be made for the satisfaction of those new wants which this spread involves.

Over-pressure as a cause of suicide.

265. "We are apt to attribute the growing tendency to suicide to the nervous wear and tear of an age of over-pressure, to the railway, the steamboat, the post, the

telegraph. This has become one of the commonplaces of the day, but it is only one side of the question. Suicide is common in stagnant China, whether from religion, misery, boredom, or that weariness with life which seems one of the inevitable concomitants of an ancient civilisation. There is under-pressure as well as over-pressure. Legitimate and normal development is foreign to both.

Effects of religion on suicide.

266. "We have mentioned religion, and no account of suicide would be at all adequate, which neglected this essential factor. Every classical scholar knows how profound is the difference between the ancient and the modern mind on this subject, and this difference is due mainly at least to the teachings of Christianity. The ancient Greek and Roman saw nothing wicked, but rather everything meritorious, involuntarily terminating a life which has been robbed of all happiness and value by domestic, personal, or national calamity. Aristotle, Demosthenes, Cato, Seneca, and Hannibal sought refuge in suicide from overwhelming misfortune and their example, so far from being condemned by heathen writers, was held up to admiration and imitation. Christianity however from the first put its darkest stigma on self-murder and contributed powerfully to the dissemination of that sentiment of horror which now surrounds—probably very salutarily—the subject of suicide."—*The Lancet*, 20th June, 1891, pp. 1389-90.

[*Statement.*

Accidental Deaths in Madras.

Statistics of accidental deaths in Madras.

District.	No. of accidental deaths, suicides, and drowning.	Population.	Ratio of deaths per population.	Ratio of deaths, accidents, and suicides per total deaths from all causes.	The same including snake bites at the rate of 100 per district.	Deaths from all causes.
			one in	one in	one in	
Madras City ...	49	405,840	8282	320	...	15,078
Ganjam	225	1,749,604	7776	69	48	15,688
Vizagapatam ...	377 }	2,159,939	4864	37	30	16,052
Jeypore	56 }					
Godaveri	446	1,755,856	3936	58	47	25,951
Kristna	383	1,548,480	4584	76	60	29,234
Nellore	424	1,220,236	3035	37	30	15,185
Kurnool	182	709,305	3897	69	45	15,078
Cuddapah	471	1,121,038	2167	40	33	12,628
North Arcot ...	570	1,817,814	3184	47	40	18,947
Chingleput ...	309	981,381	3093	62	46	19,195
South Arcot ...	315	1,814,738	5780	107	84	33,833
Tanjore	253	2,130,383	8420	174	128	44,097
Trichinopoly ...	258	1,215,033	4709	98	71	25,436
Madura	330	2,168,680	6416	63	48	24,402
Tinnevelly	401	1,699,747	4211	80	64	32,434
Salem	432	1,599,595	3700	58	47	25,180
Coimbatore ...	542	1,657,690	3058	59	48	28,047
South Canara ...	283	988,165	3490	68	50	19,469
Malabar	408	2,433,122	5855	127	107	51,395

(*N.B.*—In the above calculations decimals are omitted.)

267. The indications for the treatment of the drowned are,— Treatment of the drowned.

(*a*) To restore the animal heat.

(*b*) To stimulate the action of the heart.

(*c*) To carry on artificial respiration, until the natural action is resumed.

(*d*) To rouse the nervous centres.

(*e*) To combat the tendency to death from inflammatory or other sequellæ.

Method of restoring animal heat.

268. The *first* of these indications is carried out by covering the patient with blankets or flannels, applying hot bottles on the feet, legs, loins, and arm-pits. The second by applying a mustard plaister over the region of the heart—or better a hot mustard poultice—and rubbing the limbs upwards, that is, towards the heart, and giving the patient small doses of some volatile or alcoholic stimulant. The nervous system may be roused by stimulants, or electricity, or flagellation with a wet towel. Secondary mischief may be prevented by watching the patient carefully for a few days, and attending at once to any inflammatory complication arising in internal organs.

Methods of artificial respiration.

269. There are three chief ways of carrying out artificial respiration,—Howard's, Sylvester's, and Marshall Hall's, named in their order of merit.

Howard's method of artificial respiration.

270. *Howard's direct method* is employed as follows :—(*a*) Instantly turn the patient's face downwards with a large firm roll of clothing under the stomach and chest. Press with your weight two or three times, for four or five seconds, each time, upon the patient's back, so that the water is pressed out of the lungs and stomach, and drains feebly downwards out of the mouth. Then (*b*) quickly turn the patient face upwards, the roll of clothing being now put under his back just below the shoulder blades, the head hanging back as low as possible; place the patient's hands together above his head; kneel with the patient's hips between your knees; fix your elbows against your hips. Now, grasping the lower part of the patient's chest, squeeze the two sides together, pressing gradually forwards with all your weight for about three seconds until your mouth is nearly over the mouth of the patient; then, with a push, suddenly jerk yourself backwards. Rest about three seconds, then begin again. Repeat these bellows-blowing movements, so that the air may be sucked into the lungs about eight or ten times a minute. Remember, the above directions must be used on the spot, the instant the patient

is taken from the water. A moment's delay and success may be hopeless. As soon as the water is pressed from the lungs, all clothing should be ripped away from the chest and throat. In making the pressure either for the removal of the water or for breathing, increase it gradually and thoroughly, and suddenly let go with a jerk. With women and children use less force. Do not stop these movements under an hour unless the patient breathes. Be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before.

Sylvester's method of artificial respiration

271. *Sylvester's method.*—Grasp the patient's arms above the elbow and pull them upwards until they meet above the head; this has the effect of causing the air to enter the lungs and imitates natural inspiration. Next bring the arms back to the sides, and repeat this upward and downward movement about fifteen or sixteen times in a minute, and continue doing so until the patient breathes naturally or all hopes of his recovery are gone.

Marshall Hall's method of artificial respiration.

272. *Marshall Hall's method.*—This method is easy to carry out but less efficient than either of the foregoing, although certain authorities have recently claimed for it a superiority over all other methods. The body is rolled half over—from the position of lying on the back—to that of lying on the side, when the arm which is uppermost is pulled forwards out of the way, and pressure is made on the side of the chest to expel as much air as possible. This corresponds with the expiratory movement. The body is then rolled over on the back (the inspiratory movement), and these movements are repeated at the same rate as in Sylvester's method.

273. Artificial respiration has been successful after five hours apparently suspended animation. When breathing is properly established, cover the patient with warm clothes, particularly warm blankets.

ILLUSTRATIVE CASES.

Case No. LV.—Mistaken case of drowning.

Chevers gives the following remarkable case of mistaken *post-mortem* signs, which shows how cautions a medical man should be before committing himself to an opinion. Dr. Woodford, at Calcutta, made a *post-mortem* examination of the body of a European sailor at the police dead-house. He found the clothes saturated with water. Sanious froth was round the nostrils: the hands were somewhat soddened, but the boots, which were wet, had preserved the feet. It was twenty-four hours after death, and decomposition was advancing rapidly. The skin was vesicated and the body covered with particles of sand. The vessels of the brain and the right side of the heart were engorged* with blood. The lungs and other viscera were highly congested. He certified that deceased died from submersion in water. The coroner returned the certificate for explanation, as the police reported that the deceased had died in the police lock-up from apoplexy. The clear explanation was, that the body had been carried from the lock-up to the dead-house, a very small godown, with open windows, only three feet from the ground. It was placed on a table under a window on the west side rain had fallen in torrents all night, and the wind blew from the west. Dr. Woodford found the body on a table in the centre of the room. The clothes were, as we have seen, saturated, and the body was covered with particles of sand. (Dr. Woodford observes that, in Bengal, drowned bodies, which have not been disturbed, are invariably covered with particles of fine sand.) The sand had been driven on to the body by the rain from the loose plaster at the upper part of the window cornice. Chevers remarks: "Thus all the usual external appearances of drowning presented themselves, and the internal morbid appearances were simulated by those of apoplectic death." It seems, however, that in this case two important internal symptoms were wanting, which should have led Dr. Woodford to make further enquiries, *viz.*, the absence of any water in the stomach or lungs, and the absence of mucous froth in the lungs or air vessels. If a person had been drowned and had presented the internal symptoms recorded, it is exceedingly improbable, though not impossible, that there should have been no water in the stomach and lungs and no mucous froth in the air vessels. The fact of mucous froth round the nostrils should have shown that the water could not have escaped from the stomach, and cleared the air-vesicles, by rough handling of the body. The above case is very interesting as showing what care is needed in a *post-mortem* examination of bodies found drowned, and how little confidence can be placed upon the superficial signs.

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* That is, over-distended with blood, vascular congestion.

CASE No. LVI.—ANOTHER DOUBTFUL CASE OF DROWNING.

CASPER gives the case of a man found drowned ten weeks after he had been missed. He had gone to discharge some rent due, and the receipt was found in his pocket, but a document, which it was known he had taken with him, was missing. The body was, of course, extremely putrefied, the eyes staring, and the tongue firmly wedged between the teeth. On the left side of the throat there was a whitish depressed mark, two lines broad. The lungs were much distended: left side of heart empty, and the right filled with blood, which was rather dark and treacly. The trachea still contained a small quantity of bloody froth. No water was found there, or in the lungs or stomach. The brain had become converted into a bloody pap, and could not be examined. The skull-bones, however, were uninjured. The duodenum* and œsophagus (or food-pipe) were chemically examined, but showed no trace of poison. "We gave it as our opinion (1) that deceased had died from asphyxia; (2) that it was possible, and indeed probable, that this had been occasioned by drowning; (3) that the high degree of putrefaction in which the body was, prevented any certain conclusions being drawn from the mark found upon the neck; (4) that, supposing death to have been caused by drowning, it cannot be determined, with any degree of probability, whether it has been a case of homicide, suicide, or accident." After several months the missing document was found, and further judicial investigations placed it beyond doubt, that in this case the death from drowning had been suicidal.

CASE No. LVII.—ANOTHER CASE OF DROWNING.

IN the following case, quoted by Casper, of an epileptic, who was found drowned with his face in a shallow turf-pit, we give, as an example, the *verbatim* "minute of the examination". This is a document upon which, in Germany, great stress is laid, and the report itself will show with what care the examination was conducted, and how every point of importance is touched upon:—

A.—External Inspection.

(1) The body is five feet five inches in length, apparently about forty years old, well-nourished; has an abundance of light-brown hair, the eyes are blue, and the tongue lies behind the teeth. The tongue is covered with mud, particularly towards its point.

(2) *Rigor mortis* does not exist.

(3) The colour of the body is the usual corpse colour, only the abdomen is green from putrefaction, and the whole countenance red from *post-mortem* staining, proved to be such by incisions.†

(4) About the middle of the forehead there are two spots, situate one above the other, of a reddish-brown colour inclining to yellow,

* The *duodenum* is the first part of the small intestines, being continuous above with the stomach.

† The deceased was found dead, lying on his face, and with it half immersed in a shallow muddy puddle close to the bank,

hard to cut, roundish in form, and about three-quarters of an inch in diameter. Incision through these spots brought to light no extravasation of blood.

(5) The ridge of the nose displayed the same condition already described under No. 4.

(6) The posterior surface of the upper extremities, several parts of the face, also the back of the body, are soiled with mud.

(7) The hands and feet are bluish, and both, but particularly the former, display longitudinal corrugations, especially on the fingers.

(8) The skin on the inferior extremities and on the right arm displayed the condition termed *cutis anserina* or "goose-skin."

(9) No foreign bodies are found in the natural cavities, with the exception of some mud removed from the fauces.

(10) At the external angle of the left eye, after removal of the mud, a dark bluish-red coloration of the upper and under eyelids became visible, which, when incised, betrayed a trifling extravasation.

(11) The neck and sexual parts are natural, and there appears nothing else to remark on the external surface of the body.

B.—Internal Inspection.

I.—*Opening of the Cranial Cavity.*

(12) The soft parts covering the cranium display nothing unusual. The skull-bones are uninjured, and are of the unusual thickness of three lines.

(13) The vascular meninges* display a visible, but not extraordinary, degree of congestion.

(14) The brain is firm, but not much congested.

(15) The lateral ventricles† are tolerably well filled with serum, the choroid plexuses‡ tolerably congested.

(16) The cerebellum§ is quite normal.

(17) This is also the case with the pons Varolii and the medulla oblongata.

(18) All the sinuses|| are much congested.

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* The *meninges* are the membranes covering the brain and spinal cord ; here those of the brain being referred to.

† The *ventricles* of the brain are spaces formed in that organ during its development. The *lateral ventricles* are two in number, situated one on each side deep in the brain substance and are formed by the upper part of the general ventricular space in the interior of the brain.

‡ The *choroid plexuses* are dense vascular networks in the lateral ventricles of the brain.

§ The *cerebellum* is the inferior part of the brain lying below the cerebrum.

|| The sinuses of the skull are large venous canals having their walls in the majority of cases formed partly by the bones themselves.

(19) The *basis cranii* (or bones forming the base of the skull) is uninjured, and there is nothing else to remark in regard to the cranial cavity.

II.—*Opening of the Thorax.*

(20) All the organs are in their natural position. The right lung is partially connected to the ribs by means of old adhesions; both lungs are darker in colour than usual, completely filling the thoracic cavity and are very full of blood, without being excessively so. There is no water in the lungs.

(21) The large blood-vessels are also not unusually congested.

(22) In the pericardium* there is the usual quantity of fluid. The coronary† vessels of the heart are very strongly congested, and the right side of that organ is turgid with dark and perfectly fluid blood, while the left is empty.

(23) The trachea (or windpipe) and larynx‡ are empty and in no respect abnormal; muddy mucous flows downwards from above during the examination.

(24) The œsophagus is empty.

(25) In the left pleural cavity there are about three ounces of bloody fluid.

III.—*Opening of the Abdominal Cavity.*

(26) All the organs occupy their natural positions. The stomach is full of a greenish-yellow watery fluid, in which the remains of food and some mud can be recognized, in other respects it is normal.

(27) The pancreas is normal.

(28) The liver is strongly congested with dark fluid blood, the gall-bladder is full.

(29) There is nothing remarkable about the spleen.

(30) The mesenteries§ and omenta§ are very fatty.

(31) The kidneys are much congested.

(32) In regard to the intestines, we have only to remark that the large one is full of fæcal matter.

(33) The urinary bladder is empty.

(34) The *vena cava ascendens*‖ is tolerably distended, with dark fluid blood.

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* The *pericardium* is the tough fibrous and serous membrane which covers the heart.

† The *coronary vessels* are the channels which convey blood to and from the substance of the heart.

‡ The *larynx* is the organ of the voice and the highest part of the windpipe.

§ The *mesenteries* and *omenta* are modified folds of the serous membrane or peritoneum which invests all the organs contained in the abdominal cavity.

‖ The *ascending vena cava* is the large vein which conveys the venous blood from the lower extremities and abdominal organs to the right auricle of the heart.

At the close of the dissection, the medical inspectors gave it as their opinion :—

(1) That the deceased had died from apoplexy of the heart and lungs.

(2) That death had occurred in a muddy fluid.

(3) That the deceased must, therefore, have been alive when he fell into the water.

(4) In answer to a question, the ecchymosis of the left eye, described under No. 10, is not to be regarded as a cause of death.

r. *a.* *s.**
(Signed) Casper. (Signed) Lütke.
a. *u.* *s.*†
Jordan. Bidault.‡

The *report* of the examination is, in Germany, a different document, and contains the opinion of the doctors, based on the facts elicited by the examination. We give *in extenso* the report of the same case :—

Medico-legal report in the matter of the inquiry respecting the mode of death of H.

H. 3. 52.§

"In conformity with the directions of the Royal District Commission of Charlottenburg, dated the 5th of this month, and referring to the above-mentioned inquiry, we have the honour to transmit to you the following document, constituting the medico-legal report required :—

"According to report,|| H., who had been for many years afflicted with epilepsy, disappeared upon a certain day, his body being soon thereafter found lying close to the bank of a turf-pit near Charlottenburg; he was reported to have been robbed, and therefore a medico-legal examination was rendered necessary. The dissection was performed by the subscribing medical inspectors, on the 26th of March, with the following results" :—

A.—External Examination.

(Here follows, word for word, the report of the anatomical appearances as given above, to which is added the following opinion :)

"In our provisional opinion we have assumed as probable that the deceased had fallen into the water alive, and therein met his death, that he consequently was drowned, and we must still maintain this view. For not only were the signs of every other species of unnatural death awanting, since the trifling ecchymosis described under No. 10, being in no way connected with any important organ, could have had no influence whatever in

* Read over—approved—signed. The German letters are *v. g. u.* :—Vorgelesen, genehmigt, unterschrieben.

† *Actum ut supra.*

‡ These are the signatures of the legal official present, and of the sworn clerk who drew up the minute.

§ The reference numerals of the corresponding documents.

|| In this case no documents were given us, only a copy of the minute of the dissection

producing death, and the marks upon the forehead and nose (mentioned under Nos. 4 and 5) were very probably made after death, and were at any rate of no importance whatever; but the results of the dissection also revealed the existence in the body of most of the appearances usually found in those drowned. Amongst these, medico-legal experience enables us to reckon the bluish coloration and wrinkled condition of the skin upon the hands and feet (7),—which of themselves, however, only prove that the body must have lain some time in the water—the so-called *cutis anserina*, which was quite distinct in certain parts of the body (8), the mud found in the fauces* (9); and along with those external appearances of the body, the *corresponding* internal ones, which, taken together, are extremely demonstrative, *viz.*, the visible congestion of the cerebral membranes (13), and of all the cerebral sinuses (18), the congestion of the lungs (20), of the coronary vessels of the heart, and of the right side of the heart itself (22); the remarkable distension of the lungs (20), the congestion of the liver and kidneys (23 and 31), and the fluidity of the blood in the body generally (22 and 34), which, as well as the appearances found in the stomach, must be regarded as particularly important symptoms. The stomach was distended with a watery fluid, in which were distinctly visible isolated particles of mud (26), precisely similar to that which we found upon the tongue and in the fauces, from which it incontestably follows that the deceased must have swallowed after falling into this muddy fluid; must, therefore, have been alive, since water cannot flow into the stomach after death; consequently, it cannot possibly be supposed that the deceased was already dead when he fell into the water; and this view is also supported by the other existing appearances symptomatic of death by drowning. The deceased has in fact died from apoplexy of the heart (asphyxia), like a great many of those that die in the water, has consequently been drowned. Had we been asked whether the deceased had committed suicide, or met with his death accidentally or by the fault of a third party, we must have stated, that the dissection revealed neither proof nor probability of there being any third party criminally concerned with the death (by violently throwing the man, while still alive, into the puddle); while, contrariwise, it is a most probable supposition that H. met with his death in the water by suicide or accident, having been suddenly seized with an epileptic fit, for instance, while standing by the edge of the water, and so fallen in and been drowned. Should it really be found, which we know not, that the deceased has been found robbed, and close to the bank, this would in nowise militate against our view; for it is self-evident that nothing could be more likely than that a third party, seeing the body floating in the pool or lying near its bank, should drag it ashore and plunder it.†

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* The *fauces* is the space surrounded by the palate, tonsils and uvula or little tongue.

† It afterwards appeared that there was not the slightest trace of any crime committed on the drowned man. What might not, however, have been made of this case in the medico-legal report, by means of a few judicious doubts and forced interpretations! (*Note by Dr. Casper.*)

"We accordingly declare it to be our opinion, that H. has fallen into the water alive, and died in it from drowning.—Berlin, 19th April 1852.

"Casper. (Official seal) "Lütke, *chir. for.* (Official seal.)"

CASE NO. LVIII.—DEATH FROM DROWNING CAUSED BY EPILEPSY.

OGSTON gives a case of a man who was seized with an epileptic fit whilst leaving a privy, and fell with his face in some dirty water, which was contained in a space not exceeding a foot and a half in breadth, with a depth of only three or four inches.

Another case is quoted by Taylor, as given by Devergie, in which a man was found drowned in a small stream, his face towards the ground and his head just covered by water, which was not more than a foot in depth. On dissection, there were all the appearances of drowning present, and a large quantity of sand and gravel was found occupying the windpipe and smaller air tubes.

CASE NO. LIX.—ANOTHER CASE OF DROWNING.

THE following case is from Chevers, and shows how the nature of the water and substance found in the stomach may lead to the detection of crime:—The body of a child was found in a tank at a considerable distance from his own house, and suspicion was naturally excited that he had been conveyed thither and made away with. Dissection afforded clear evidence of death from drowning: the fauces, larynx, and trachea contained small portions of green vegetable matter, and the right bronchus was almost completely filled with so large a portion of an aquatic weed, doubled together, that it appeared astonishing how any such body could pass the *rima*.* It was afterwards proved distinctly that no weed of the kind grew in the tank where the body was found. Further enquiry led to the discovery that the boy's body had been found by a woman in a tank near his home, in which the weed, lodged in the air passages, grew abundantly. This female had conveyed the corpse to the more distant tank which belonged to a person against whom she bore a grudge.† A similar case is to be found in *Reg.* v. *Thornton*, Warwick Summer Assizes, 1817.

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* The *rima, rima glottidis*, or chink of the glottis, is the opening at the top of the larynx.

† For further cases of asphyxia drowning, consult—

Reg. *v.* Cowper (London Law Magazine, Vol. X. (State Trials.)

Reg. *v.* George Hereford, L. Ass., 1847.

Reg. *v.* Barker, York Winter Ass., 1846 (state of blood in cases of drowning.)

Reg. *v.* Griffin Tailor, Vol. II, page 24.

CHAPTER II.

HANGING AND STRANGULATION.

Cause of death—Apoplexy or asphyxia—Dr. MacKenzie's statistics of cases of hanging—Judicial hanging—Mark of ligature on the neck—Hanging usually due to suicide—Points to be noted when hanged body first discovered—The Suriyana Kovil case of alleged suicide—Necessity for noting every appearance at first examination of a body—Case of Mahabir charged with murder—Details to be observed in cases of alleged suicide—Emission of semen and fæces—Strangling—Death by strangulation without marks of injuries—Death can be caused by hanging without body being suspended—Statistics of incomplete hanging—Cord should be examined in cases of hanged bodies—Warmth of body important evidence—External appearances in death by hanging—Internal appearances in death by hanging—Case of murder by suffocation—Death by strangulation—Different modes of strangulation—Throttling—Marks on the throat in death by epilepsy—Mark round the neck may be due to hypostasis—Statistics of *post-mortem* conditions in cases of death by suicide—Nature of cord used by suicides—Remarks on above-cited cases of suicide—Outlines for examination and inspection of bodies in cases of hanging or strangulation.

WHEN death is caused by hanging, there has been more or less perfect suspension of the body by a cord applied round the neck, the weight of the body being the constricting force, but in strangulation the constricting force is due to some other cause. If the constricting force is so great as to prevent any air reaching the lungs, death results from asphyxia; if, however, owing to the looseness of the cord, or its position round the neck, a small quantity of air can reach the lungs, then death is caused, not by asphyxia, but by interruption of the circulation of blood to the brain, owing to the compression of the great vessels of the neck. In this case apoplexy is the immediate cause of death. Of course, in a great many cases, death may be caused by a combination of both asphyxia and apoplexy. Cause of death.

Apoplexy or asphyxia.

274. The following table, given by Taylor, shows the results at which Casper and Remer arrived from the examination of a large number of cases :—

	Remer.	Casper.
Apoplexy.	9	9
Asphyxia.	6	14
Mixed conditions	68	62
	83	85

Dr. MacKenzie's statistics of cases of hanging.

275. We would make the following quotation from the record of Dr. MacKenzie's investigations :—

"I think it may prove interesting to record my experience of the cases of hanging which have occurred in the largest city in India, extending over a period of about nine years. I give the principal facts regarding the cases which came under my observation during this time :—

"I had to examine 130 cases of hanging sent to me by the police during this period; of these 65 were males and 65 females; they were all adults and adolescents. Of these 130 cases, 127 were natives—64 females and 63 males; the remaining three were—one European male, one Chinaman, and one East Indian female; they were all suicides. The causes assigned for these persons taking their lives were as follows :—

Family disagreement	38
Ill-health	35
No reason assigned	24
Drunkenness	9
Insanity	9
Poverty	4
False accusations	2
Found in possession of counterfeit coins .	2
Remorse at having lead immoral lives .	2
Grief on account of the death of a near relation	1

Serious illness of a child	1
Disappointment in love	1
Jealousy	1
Theft	1
	130

"Of these 130 cases no less than 119 or 91·54 per cent. died from asphyxia; 8 or 6·15 per cent. from asphyxia as well as apoplexy; 2 or 1·53 per cent. from syncope, and 1 or ·76 per cent. from apoplexy."

276. In cases of judicial hanging, it often occurs that the vertebræ of the neck are dislocated; but it has been observed by Hammond, an American writer, that any extra violence used for the purpose of causing this dislocation is wrong, useless, and barbarous. The dislocation does not cause death, and only inflicts unnecessary pain. In hanging,—death being caused by asphyxia, or apoplexy, or both,—the object should be to produce immediate asphyxia, by adjusting the noose so as to close the windpipe at once. Hammond considers that the most effectual way is to adjust the rope whilst the criminal is standing, and then to raise him from the ground. In the case of persons weighing under 150 lbs., he recommends that a weight should be attached to the feet, so as to insure sufficient traction of the cord. Judicial hanging.

277. It is commonly considered, by persons who have not studied the subject, that in cases of death by hanging, there must necessarily be a strongly developed mark of the ligature round the neck; this, however, is by no means the case. In cases of judicial hanging, where much violence is used, the mark of the ligature may be found, and there is often ecchymosis of the neck, but in suicidal hanging there is often no mark at all to be found. Out of seventy-one cases examined by Casper, there was no mark whatsoever in fifty; on the other hand, Casper has found that the mark round the neck can be produced by suspension Mark of ligature on the neck.

after death. The conclusion generally arrived at is, that it is rare to find ecchymoses in the mark on the neck, and Casper considers that it is nothing more than a cadaveric appearance, and that it may become livid or dark-coloured after death, just as lividity appears in the dead body during the act of cooling. The presence or absence of a mark round the neck is, therefore, no proof, one way or the other, of hanging having taken place during life.

Hanging usually due to suicide.

278. By far the greater number of cases of hanging is the result of suicide, because so much violence is necessary in hanging, and so much opposition may be expected from the victim, that a murderer does not often have recourse to this means of causing death. But because hanging is often the result of suicide, it frequently occurs, especially in this country, that persons are first killed, or rendered unconscious, and then hung up, so as to create an impression of suicide. There are numerous cases on record in India in which the body was hung up after death, the murder having been previously perpetrated in other ways. Chevers (page 597) quotes many such cases. If, however, a body were found hanging with marks of violence—such as blows or wounds—on it, it would at once be suspected that the case could not be one of suicide.* Hence, if a murder has been committed, it will generally have been caused by suffocation or strangulation first of all. If a person has first been strangled, and then hung up, it follows that the internal symptoms will be exactly the same as they would have been had death been caused by hanging. It is, therefore, chiefly from the external symptoms that an opinion can be formed.

Points to be noted when hanged body first discovered.

279. Bearing this in mind, it is of the most absolute importance that, when the body is first discovered, every sign and symptom should be carefully noted. If the body is in a room, the size of the room should be carefully

* The presence of marks of self-inflicted mechanical violence, on the other hand, tends to strengthen the presumption of suicidal hanging.

measured; the position of the body, with reference to the walls, the length of the rope, the nature of the knots, the state of the hands, any marks on the clothes or the body, etc.

The Suriyana Kovil case of alleged suicide.

280. A very remarkable case occurred at Combaconum in 1882. A high priest of a *mutt*,* a person of very great sanctity, was found hanging in a cell in the *mutt*. He was in the habit of sleeping alone inside the building, and when found, the outside doors were all locked from the inside. Access could only be obtained by climbing over the building and getting into the open courtyard in the middle. The *mutt* was at a village called Suriyana Kovil, about nine miles from Combaconum. The body was taken down, and the apothecary from Combaconum was sent for. He came, inspected the body, and, finding no marks of injury, certified that death had been caused by hanging, and that, in his opinion, the case was one of suicide. No internal *post-mortem* was held. The body was buried, as is usual with persons of the deceased's position, in salt. Owing to various causes, suspicion fell upon certain persons. There was apparently no cause for suicide, except the allegation, that finding certain seminal marks on the front cloth, it was supposed that deceased was suffering from a venereal complaint, and hanged himself from shame. It was also alleged that he was pecuniarily embarrassed. On the other hand, there had been a long-standing quarrel between deceased and a rival *mutt*. Deceased was found dead just on the eve of a big festival, to which he had invited a number of persons, and at which an important ceremony was to be performed. Immediately after the death, the people from the rival *mutt* took possession of deceased's property and cloister. Sixteen days after death the body was exhumed in the presence of the zillah surgeon, the

* A religious endowment, somewhat analogous to a cloister. These endowments are often of great wealth, and the heads of them are always men of great sanctity and enjoy the utmost respect. There is, however, often great rivalry and jealousy between different establishments, the one, as in this case, claiming superiority over the other.

superintendent of police, and the magistrate. It had been buried in very marshy ground, and, in spite of the salt, was in very advanced state of decomposition. Almost the whole of the outer cuticle had peeled off. There were some livid marks on the fore part of the legs, on the chest, and on the inside of the hands. There was scarcely any mark round the neck. The deceased was a tall, stout, and well-made man, weighing about 12 to 13 stone. No internal examination was possible. No notes had been taken of the exact position of the body at the time it was found; the cord, however, had been preserved. A lengthened enquiry took place, and the following facts were elicited:—The body was found hanging from a bamboo, the ends of which rested on a cornice of the wall which ran round the top of the cell. It was hanging from the middle of the bamboo, and was therefore in the middle of the room. A ladder was found resting against the wall, and the deceased was supposed to have got on to this ladder, tied the noose round his neck, and then to have thrown himself off. The cell was eight feet broad, and the length of the rope, between the neck and the bamboo, was a cubit or two feet. The middle of the bamboo would, therefore, be four feet from the side where the ladder was standing, and, from the position shown, it would have been impossible for a man standing on it to have tied a rope round the bamboo and then round his neck, without leaving a greater extent of rope than one cubit. Again, to show that it was a case of suicide, the witnesses, who found the body, said, that before committing the act, deceased had smeared his hands and fingers with holy ashes, of which there was a box in the room at some distance from the corpse. This was supposed to be a last act of devotion, such as is customary just before the death of a person of sanctity, and showed deceased's intention to commit suicide. But it was clear that if deceased smeared his fingers of his own act, he must have done so before hanging himself, and if so, it would have been impossible for the ashes to be found, as described on his fingers, after death, because the very

act of tying the knot round the bamboo and round his own neck, would have rubbed them off. It was clear that the ashes must have been smeared on the fingers by some third party after death. Eventually a man confessed to having taken part in the murder. The way it was done was as follows:—The prisoner was a servant of the deceased, and said that two other men belonging to the rival *mutt* talked him over and arranged to commit the crime. On the night in question, deceased was sleeping in one part of the building, and the servant in another. At a given signal, the servant opened one of the doors and let the accomplices in. They then went to where the deceased was sleeping. One man got on his chest and stuffed a ball of cloth into his mouth, and compressed his throat with the other hand; the second sat upon his legs; and a third held his hands. After all struggles had ceased, they fetched a bamboo and a ladder, hung deceased to the bamboo, and then placed it on the cornice with the ladder by the side. They then smeared the hands with ashes, and two of the murderers went out. The third locked the door from the inside, and then climbed over the roof and got away. The prisoners were committed to the court of sessions; but, as very often happens, the witnesses, who had to speak to other circumstantial points of evidence, told a great deal too much. The prisoners, after a long and careful trial, were acquitted by the judge, but there can be no doubt that in this case a murder had been committed.

Necessity for noting every appearance at first examination of a body.

281. This case is especially interesting as showing how important it is to note every fact at the first examination of the body. Any evidence which transpires afterwards is of very little value compared with that first taken. Had the fact of the length of the rope and the ashes on the hands been brought at once to the medical man's knowledge, it is probable that his suspicions would have been aroused, and a more careful examination would have been made. Of course, as is usual in such cases, it was alleged

that there were good reasons for hushing the matter up, and that the sub-magistrate, police, village authorities, and apothecary were all implicated more or less. This, however, was not proved.

Case of Mahabir charged with murder.

282. For the story of the following very similar case we are indebted to Dr. W. Hoey, Joint Magistrate of Gonda, Oudh:—Mahabir was headman of a village, and in his house lived a daughter of his deceased brother, with whom he is believed to have carried on an intrigue or to have meditated one. The woman, Bundela, was the girl's aunt, and had on two or three occasions come and taken the young girl away to a distance in order to secure her an honourable marriage. One morning Bundela was found hanging from a tree. The village chowkedar reported the matter and an Inspector of Police came to the village and called a punchayet, who found a verdict of suicide. The Superintendent of Police was not satisfied and ordered a further enquiry. Another Inspector was sent, and, after a long enquiry, procured evidence from the residents of the village to show that Bundela had been murdered the day before her body was found suspended. She had come to remove her niece, and Mahabir had entrapped her, killed her, and then carried her body out by night, and hung it from the tree. Mahabir was committed to the sessions on a charge of murder, but at the trial the witnesses turned round and contradicted the statements they had made to the Committing Magistrate. The Judge ordered an enquiry to be made into the conduct of the police, as the witnesses alleged that their evidence had been extorted and that the original report of suicide was true. Mr. Hoey was sent out to make the enquiry. He found that the branch from which the corpse had been found hanging was from 17 to 18 feet from the ground, and was the lowest branch of the tree. The trunk was about 2½ feet in diameter and could not have been climbed without the help of a ladder. There were only some 9 inches of cord between the neck of the corpse and the branch. No ladder had been found near

the tree, and no support on which Bundela could have stood in order to hang herself. It is clear, therefore, that the case could not have been one of suicide, and the report and the *punchayetnama* first sent in, were false. The first Inspector was either a fool or a knave. The murderer escaped, but the witnesses, who were all Mahabir's relatives or dependents, were convicted of perjury for having given two contradictory statements on oath, the one before the Committing Magistrate and the other before the Judge.

283. This case is a very good illustration of the absolute necessity of noticing all details, however trifling. In all cases of alleged suicide, the height from the ground, the length of rope, the way it was fastened, and the distance of the body from the nearest support, *are of the most vital importance.*

Details to be observed in cases of alleged suicide.

284. It is by no means uncommon that, at the time of death by hanging or strangulation, there is an emission of semen and fæces, and to this may be attributed the seminal stains in the above case. Many medical jurisprudents say that erection of the penis usually takes place; but it is proved that this is by no means so frequent as to justify the laying down of any rule. It has been noticed that there is frequently a discharge of saliva at the time of death, and this might furnish a very important piece of evidence. If the saliva has trickled down in front of the body and the clothes, it would seem most probable that, at the time of the discharge, and therefore of the death, the body was *hanging.* If, on the other hand, the saliva is found to have trickled out from the corners of the mouth, the body was probably lying down when death was caused, and had been hung up afterwards.

Emission of semen and fæces.

285. Strangling gives rise to death from the pressure made on the neck by any form of ligature carried circularly* round the neck.

Strangling.

* In *hanging*, the cord is usually placed more obliquely round the neck than in strangling.

Death by strangulation without marks of injuries.

286. In the Suriyana Kovil case already quoted, it will be seen that death can be caused by strangulation and suffocation, without leaving any marks of injuries. The marks possibly caused by compression of the throat, if caused at all, would be afterwards covered by the cord. It is possible, in the above case, that the livid marks on the legs, chest, and hands, may have been caused by some injury to the cuticle during the deceased's struggles. Being injured, they might have shown livid marks when decomposition set in, but at the same time there may have been no bruise or ecchymosis when the apothecary examined the body. The coincidence of these marks, with the position which the several murderers were afterwards described as having taken up, was significant.

Death can be caused by hanging without body being suspended.

287. Amongst many subordinate magistrates and the police of this country, there is a very mistaken idea that death cannot be caused by hanging, unless the body is actually suspended and the feet are off the ground. There are, however, numerous instances in which persons have been found dead from hanging, with the feet on the ground, or with the body in a sitting or kneeling position. All that is required to cause death is a sufficient weight on the cord to produce compression of the windpipe or of the important blood vessels of the neck.

Statistics of incomplete hanging.

288. Tidy quotes a table from Tardieu, giving the results of 261 cases of incomplete hanging in which death resulted :—

	Cases.
The feet resting on the ground . . .	168
The body in a kneeling posture . .	42
Ditto extended and lying down . .	29
Ditto in a sitting position . . .	19
Ditto huddled up (*accroupi*) . . .	3
	261

289. In bodies found partially suspended, attention should be paid to the cord, and its strength should be tested. Taylor cites a very important case, in which a woman was found dead in a sitting position, with a narrow tape round her neck, hung loosely and singly over a small brass hook; there was a bruise over the eye, the windpipe was lacerated, and there was a deep circular mark round the neck, which must have been caused either by suspension or by considerable pressure. As far as the tape round the neck was concerned, it was impossible that the body could have been suspended by it, because the deceased weighed 120 lbs., while the tape round the neck was found to break with a weight of 49 lbs. It was proved that the deceased had been strangled by the hand and by a ligature, and that the tape was afterwards tied so as to create a suspicion of suicide. In this case blood marks were also found on the tape where it was tied, whereas there was no blood on the hands of the deceased.

Cord should be examined in cases of hanged bodies.

290. The warmth of the body may often furnish important evidence. In the July sessions at Cuddapah, 1884, a case was tried in which this point would have been of great importance. A man had been seen quarrelling with his concubine early in the morning before sunrise, and was said to have been seen to strike her with his open hand. About half an hour afterwards he was met in the street, and engaged to come and labour. He received a small advance, which he took home, and immediately afterwards followed his employer to his work. He remained at work for two or three hours, until about 10 o'clock. Some one then brought information that his concubine was hanging in his house. He at once went home, found her hanging, and, leaving her hanging, went off, he said, to fetch the village magistrate. The village magistrate came another way and missed him, and when the man came back, the body had been taken down. There was no one to say whether at the time the body was taken down it was warm or cold. There were marks of severe injury about the head

Warmth of body important evidence.

and face; there was a fracture of the skull, and the spleen was described as having been smashed to pieces. These injuries could only have been caused after a severe and lengthened struggle, and there could be no doubt that the body had been suspended after death. The man was accused of having killed his concubine, but as the blow he was said to have given before sunrise could not have caused the injuries found, all these wounds must have been caused in the half-hour preceding the time he was engaged to go to work. During this time a quarrel must have taken place, the woman must have died from the injuries, and then have been hung up after death. There were some other contradictions in the evidence, and the prisoner was acquitted, mainly on the ground that the time did not seem to have been sufficient for all these acts. Besides this, if he had really killed and hung up his concubine, it was improbable, when he received an advance, that he should have taken it home to where the body was hanging. It was proved that the deceased's father was very angry with her for her immoral life; in fact, he admitted before the sub-magistrate that he "hated her." From the circumstances, it seemed probable that the woman had been killed whilst the accused was at work. If, however, it could have been proved that, when found, the body was still warm, there could have been no doubt that she must have been killed whilst the accused was at work. The absolute importance of noting every trifling detail when a body is first found cannot, therefore, be too strongly dwelt upon. The omission to record some little circumstance may result in the conviction of an innocent person, or in the escape of a guilty one.

External appearances in death by hanging.

291. The following are the appearances after death by hanging:—The eyes are brilliant and staring; the eyelids open and injected, and the pupils dilated; the tongue, swollen and livid, is forced against the teeth, or more or less protruded from the mouth, and compressed or torn by the contracted jaws; the lips are swollen and the mouth

distorted, and blood, or a bloody froth, hangs about the mouth and nostrils; the arms are stiff, the hands livid, and the fingers so forcibly closed on the palm as to force the nails into the flesh; the convulsions are so violent, as sometimes to cause the expulsion of the contents of the bowels, and to produce erection of the penis, with discharge of the urine, semen, or prostatic* fluid. The course of the cord is distinctly indicated by a well-marked bruise; and, on dissection, the muscles and ligaments† of the neck are found stretched, bruised, or torn, the windpipe injured, and the inner coats of the carotid arteries are sometimes divided, and more rarely there is a fracture, or *dislocation*,‡ of the cervical vertebræ§ and injury of the medulla.|| The above description from Guy applies, it must be remembered, chiefly to bodies that have been judicially hanged—a process accompanied by considerable violence. In case of suicide, these signs are by no means so strongly marked, and the face is far more composed. Suicides who have been saved from death, and others who have instituted experiments on themselves, describe the sensations in some cases as pleasurable—a sudden loss of sense and motion, sometimes a deep sleep ushered in by flashes of light, by ocular illusions, and by a roaring in the ears. In homicidal cases, however, there are always symptoms of great suffering.

292. The internal signs are those of asphyxia, already described, or of apoplexy, or of both. The stomach is often found highly congested as regards the mucous membrane, and presents the appearance of an irritant poison having been used. In this country, cases have

Internal appearances in death by hanging.

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* The fluid secreted by a small gland called the *prostate*, which is situated at the neck of the bladder.

† *Ligaments* are the dense fibrous structures which unite the bones entering into the formation of joints with one another.

‡ *Dislocation* is a surgical term applied to cases in which the articulating surfaces of bones have been forced out of their natural position.

§ That is, the vertebræ of the neck.

|| Refers to the *medula oblongata*, which connects the brain with the spinal cord.

occurred in which persons who had been poisoned have been hung up after death. In conducting an examination, therefore, it must be remembered that this appearance, as of an irritant poison, may be due to the hanging only, and an opinion should not, therefore, be formed upon it alone, but only if other traces of poison are also found.

Case of murder by suffocation.

293. With regard to the case of Campbell, for whose murder by suffocation Burke was hanged, the late Sir Robert Christison remarked, "that the lungs were remarkably free from infiltration, and although the blood in the heart and great vessels, as well as throughout the body, was fluid and black, yet the conviction in the public mind—that a well-informed medical man should always be able to detect death by suffocation, simply by an inspection of the body, and without a knowledge of collateral circumstances—is erroneous, and may have the pernicious tendency of throwing inspectors off their guard, by leading them to expect strongly-marked appearances in every case of death by suffocation. That such appearances are always very far from being present, ought to be distinctly understood by every medical man who is required to inspect a body and to give an opinion of the cause of death."

Death by strangulation.

294. In deaths by strangulation, it will be generally found that the marks round the neck are more strongly developed than is the case in suicides by hanging. More force is generally used by the murderer, and the injury to the parts is therefore greater. It is probable also that a struggle has taken place, and that marks of the struggle will be found on the body. This, however, is by no means always the case, especially in this country, where strangling is often effected—as in the case from Combaconum—whilst the victim is asleep. When there are two or three concerned in the murder, it is clear that it might be carried out without leaving any marks of violence. Strangulation is especially common in this country, where the victim has been concerned in an intrigue with a married woman or

where a wife is suspected of adultery. Chevers gives numerous instances of this crime, which, for many centuries, has been so prevalent in India. In throttling, death is due to the constant pressure of the fingers on the throat. Thuggee is now happily extinct, or occurs but very rarely, but the traditions of this crime are still firmly rooted in the minds of the people.

295. Strangulation in India is effected in many ways :— Different modes of strangulation.

(1) By compressing the throat with the hands, assisted also by the knee or foot. In these cases, owing to the violence which must be used to effect the purpose, there are sure to be very distinct marks, and it is by no means uncommon to find that the neck has been twisted round and the vertebræ dislocated. A remarkable case is quoted of a girl who strangled a boy by compressing his neck. She afterwards threw the body into a well.

(2) The throat is sometimes compressed by a stick or bamboo. The victim in such cases is generally caught lying down; his hands and feet are held by different persons, and another places a bamboo over the throat, pressing both ends on the ground. Death by this means is generally slow, and may leave but very faint indications of the way in which it has been caused.

(3) Tying the throat with a cord, cloth, or stalk. If a cord is used, it is almost certain that it will leave strongly developed marks, but this is by no means the case when a cloth is used. If a soft cloth, wrapped in broad folds, is thrown round the neck and gradually tightened, it will leave scarcely any marks, especially if at the same time death is aided by stuffing a cloth into the mouth. Flexible twigs and stalks are often used for strangling, and Chevers cites several cases of murders by this means.

Throttling.

296. Throttling by direct compression of the windpipe by the fingers is occasionally a means of committing murder, especially in children. Chevers* quotes such a case in a child and another in an adult. He likewise refers to several instances in which persons have been hanged whilst living after having been maltreated.

Marks on the throat in death by epilepsy.

297. In case of death by epilepsy,† it is alleged that the person attacked frequently grasps his own throat, so that after death marks of fingers might be found on the throat and a suspicion of murder be thus raised. Chevers mentions the case of a man subject to epileptic fits who died in a brothel, and upon whose neck were found marks of fingers. The prostitute he had been with was convicted of murder by the sessions judge, but was released by the High Court on the doubt that the death had been from epilepsy, and that deceased had clutched his own throat. An almost exactly similar case was tried at Cuddapah towards the close of 1883. Deceased had been carrying on an intrigue with two females belonging to a wealthy ryot's family, all the male members of which lived together in one enclosure. One of the women, with whom he had an intrigue, together with her mother, slept together in a separate hut. One night, two of the male members, who were sleeping together, were aroused by the mother. They went with her, and immediately came back carrying deceased's body, which they placed in another hut and called the village authorities. On examination, marks of fingers were found on the neck. There were no other injuries, but a quantity of fæces had been expelled. The medical opinion was that death had been caused by strangulation. The two men who were seen carrying the

* *Medical Jurisprudence for India*, p. 583.

† *Epilepsy* is a disease of the nervous system associated with "fits," in which the patient falls suddenly, hence called "falling sickness." In its fully developed form, convulsion, attended by complete unconsciousness, is the prominent feature. During the paroxysm, to prevent the patient from injuring himself, raise the head gently, loose all constrictions, and protect the tongue by placing a piece of cork, india-rubber, or soft wood between the teeth.

body were accused of the murder. The woman's story was, that she was awoke at night by a noise, and saw the deceased sitting on the ground near the wall of the hut. He was making a gurgling noise, and the mother then went to fetch the two sons, who, on coming, found the deceased to be dead. On the ground near where the deceased was said to have been sitting, some expelled fæces were found. There was no evidence to show that the deceased had been formerly liable to epileptic fits. For the prosecution it was urged, that the other woman, with whom deceased had had an intrigue, had told her brothers of this assignation, that they had surprised deceased with their sister, and had strangled him. Although the expulsion of fæces is by no means an uncommon symptom of death by hanging and strangulation, it is by no means confined to such cases, but is also found in many other cases of sudden death, as by gun-shot wounds, shock, etc. If deceased had been surprised with the woman, it was difficult to understand how he could have been taken away and strangled on the ground where the fæces were found, without there being more marks of injury. Had the fæces been found on the bed, the prosecution story would have been more credible. There was a possibility of deceased having died in a fit, and the action of the accused, in at once sending for the village authorities, was against the presumption that they had been the murderers. Giving the prisoners the benefit of the doubt raised, they were acquitted, and though Government were moved to appeal against the acquittal, the Government pleader advised that no appeal should be made.

Mark round the neck may be due to hypostasis.

298. The appearance of strangulation, from a mark round the neck, may often be caused by *post-mortem* lividity or hypostasis. When a body is advanced in decomposition, the neck may become discoloured, so as to exactly simulate the mark caused by a ligature. Great care should, therefore, be used before expressing an opinion founded on such a mark, and it should always be remembered that

the only test for distinguishing between hypostasis and real ecchymosis is by incision of the part. If this has not been done, no reliance whatever can be placed upon the evidence of the medical witness as to the cause of the mark.

Statistics of *post-mortem* conditions in cases of death by suicide.

299. The following details, abstracted from *Medico-Legal Experiences in Calcutta,* are highly interesting. Dr. MacKenzie found that of his 130 cases, in 81 the *position of the tongue* was noted, and in 41, or 50·61 per cent., it was found to be protruded between the teeth but not injured; in 61 cases a note was made as to whether it was bitten, and of these the tongue was found injured in 16 or 26·22 per cent. A note was made in 40 cases regarding the *eyes,* and in 15 or 37·15 per cent. the eyes were open and the eye-balls were protruded. In 21 cases *frothy mucus* was looked for around the *mouth* and nostrils, and in 20 or 95·23 per cent. it was found; 91 cases were noted regarding two lines of mucus at the angles of the mouth, and it was present in 23 or 25·57 per cent. The condition of the *fingers* was noted in 42 of the persons hanged, and they were found to be flexed or clenched in 17 or 40·47. The condition of the nails was noted in 15 cases, and in every one of them they were found to be of a blue colour. In 92 cases 30 or 32·60 per cent. had *vaginal* or *urethral discharges.* Out of 23 cases noted, 8 or 34·78 per cent. had discharge of fæces from the rectum. In 8 cases the condition of the penis was noted, and in 3 or 37·50 per cent. it was found to be erected. The *hyoid bone* was found *fractured* in 24 cases or 25·80 per cent. out of a total of 93 observed. Notes were made regarding the *thyroid cartilage* in 64 persons suspended, and of the cricoid cartilage in 11, and in not one of either set of cases was it found to be fractured. Notes were made in 77 cases regarding the *fracture* and *dislocation of the neck,* and in not a single case was there any injury of the vertebræ. Of the 90 cases in which the *coats of the carotid arteries* were observed, in 31 or 34·44 they were found to be ruptured. In 16 or 51·61 per cent. of these 31 cases, the internal

coat, in 4 or 12·90 per cent. the middle coats, and in 11 or 35·48 per cent. both the internal and middle coats, were ruptured.

300. The nature of the cord by means of which these 130 persons committed suicide is as follows:—"73 used ropes of various materials and thickness; 30 suspended themselves by means of their dhootes, sarees, or chudders; 25 cases were not noted; one person—a determined suicide —used both a rope and the cloth he wore to destroy himself; and one Brahmin hanged himself by his Brahminical thread." Nature of cord used by suicides.

301. Regarding the foregoing facts, Dr. MacKenzie makes the following remarks:—"The above notes point to the fact that in these 130 cases of suicide, family disputes and ill-health were the two principal causes. The causes of death in the majority of these cases was asphyxia, and not the combined asphyxia and apoplexy which Casper in Germany found to be the most frequent mode of death. I regret that the notes regarding some of the prominent appearances in death by hanging were not recorded in every case, but, as far as they have been noted, they are of great interest, especially regarding the appearance of the eyes and eye-balls. In only 37·15 per cent. of the cases noted the eye-lids were found to be open and the eye-balls protruded. It will also be seen from these notes that in not a single case was there a fracture or dislocation of the neck, and I can say from memory that this was the case in every one of the 130 *post-mortems* given above. The above cases point to the fact that, although fractures of the hyoid bones occurred in 25·80 per cent. of cases, not a single case of fracture of the thyroid or cricoid cartilages was found. In cases in which a rope was used, the mark on the neck was well defined, indented, and parchment-like, while in the cases in which cloth ligatures were used the marks were faint, of a reddish colour, and not parchment-like, except in places where the cloth was twisted and where the pressure Remarks on above-cited cases of suicide.

was great. The man who committed suicide by means of his Brahminical thread was a big stout Brahmin. He had returned home late at night boisterously drunk, and commenced to abuse his own family and neighbours. The family, expecting that he would assault them, locked him out of the house into the outer court-yard, where he entered a cow-shed and hanged himself. He twisted his Brahminical thread into several ply, and was found suspended off the ground by means of it. The mark of the cord round the neck corresponded with the Brahminical thread; it was very narrow and deeply indented into the skin of the neck, which was parchment-like in appearance. In not one of the 130 cases were the muscles of the neck, the larynx, trachea, or large bronchi injured; and in none of them was there any extravasation beneath the skin of the neck, or blisters above the constriction of the cord."

[*Note.*—As the different points of importance have all been discussed in cases quoted in the text, no Illustrative Cases are given to this chapter.]

Outlines for examination and inspection of bodies in cases of hanging or strangulation.

302. The following outlines for the inspection and examination of a body in a case of hanging or strangulation is important in connection with the investigation of such cases:—

Suggestive Outline for the Inspection and Examination of bodies in cases of Hanging or Strangulation.

I.—It is advisable to have a photograph taken of the body, as well as the furniture and of other articles in the room or place in which the body is found, before anything is touched.

II.—GENERAL ENQUIRIES—

(*a*) Was the room locked on the inside, without other possible means of escape?

(*b*) Were any fire-arms or other weapons, or marks of blood, or signs of struggling, noticed about the room?

(*c*) Is the dress of the deceased torn, or the hair disarranged?

(*d*) Does the dress, etc., indicate any interference with the body after death?

(*e*) Note the position of the body and the character of the dress worn, (any constricting articles of dress about the neck?)

(*f*) What is the weight of the deceased? This is important if a question should arise as to the power of the cord to sustain the ascertained weight.

III.—Notes respecting the Ligatures used—

(*a*) If the ligature is still round the neck, carefully note (or better still sketch) its exact position; the number, the character, and the method of tying the knot or knots (that is, whether the tying was the work of a right or left-handed person); and the exact position of the knots. Remove the cord by cutting so as to leave the knots intact.

(*b*) If the ligature has been removed, ask for it.

(*c*) Preserve and retain the ligature for evidence. It may be needful to compare it, with some material either in the possession of an accused person, or belonging to the deceased; or its possession may be traced to some one else.

(*d*) Note the material of which the ligature is composed.

(*e*) Do the ends of the ligature appear (if a rope) to have been freshly cut?

(*f*) Compare the ligature with the impression on the neck.

(*g*) Note whether there is any brown line on the ligature, such as might result from perspiration.

(*h*) What is the strength (or weight-bearing power) of the ligature by which the body was suspended? *

(*i*) Are there any marks of blood, or of hair or other matters, adherent to the ligature?

IV.—External Appearances—

(*a*) Are there any marks of violence on the deceased, other than those directly caused by the hanging or strangling?

(*b*) By what instrument were these marks (if present) likely to have been inflicted?

(*c*) Are they sufficient in themselves to account for death; or, if not sufficient, are they of such a character that they would induce great weakness from loss of blood?

(*d*) Were they probably accidental, suicidal, or homicidal (*i.e.*, likely to be caused in a struggle)?

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* The *strength* of a rope is that of its *weakest* part. This may be tested by suspending it (by a loop) from a ring or hook and adding weights till it breaks.

The rules often given, such as the following, are useless for small cords:

"To estimate the strength of a cord of hemp, multiply the square of its number of inches in girth by 200, and the product will express in pounds the practical strain it may be safely loaded with. In the case of cables, multiply by 120 instead of 200." The ultimate strain is probably double this. Again, "in cables, the strength, when twisted, is to the strength when the fibres are parallel, as about 3 to 4." (Gregory.) The only safe way of answering questions as to the strength of cords, etc., is by experiment. As some guide to the *comparative* strength of materials, we give the following table of the breaking strain of certain fibres.

Fibre.	According to De Candolle.	According to Labillardière.
Flax (*Linum usitatissimum*)	11·7	1000
Hemp (*Cannabis sativa*)	16·3	1370
New Zealand Flax (*Phormium tenax*) .	23·8	1996
Pita Flax or American Aloe (*Agave Americana*)...	7·0	596
Silk	34·0	2894

(*e*) Note—

(*i*) *Face.*—Pale ? Swollen ? Placid ?

(*ii*) *Mouth* and *Nostrils.*—Foam ?

(*iii*) *Tongue.*—Position ? Colour ? Whether injured or not ?

(*iv*) *Eyes.*—Prominent ?

(*v*) *Pupils.*—Dilated ?

(*f*) *Neck.*—Note—

(*i*) *Character of Marks.*—Presence of a groove ? Whether it be complete or not ? Colour of the borders of the groove, and of the parts beyond ? Marks of fingers, etc. ?

(*ii*) *Direction of the Marks.*—Whether oblique or not. Note the apparent position of the knots.

(*iii*) State of the integuments (or skin) in the furrow.

(*iv*) Any excoriations (or superficial abrasions) or ecchymoses.

(*g*) *Hands.*—Bloody ? Clenched ? Anything in the hands ? (Carefully preserve any hair, etc., that may be found grasped or attached.)

(*h*) *Sexual Organs.*—(In the male, note if there be spermatic (or seminal) fluid in the urethra or canal of the penis.)

V.—INTERNAL APPEARANCES—

(*a*) *Neck.*—

(*i*) Dissect out the mark around the neck, cutting for this purpose through the skin an inch above and an inch below

the mark. Note the state of the underlying tissues, the presence of coagula (or blood clots), etc.

(*ii*) The entirety or otherwise of the muscles of the neck ?

(*iii*) Effusion of blood amongst the muscles and ligaments.

(*iv*) Injury to the larynx and trachea.

(*v*) ,, ,, ligaments of neck.

(*vi*) ,, ,, bones (specially the os hyoides,* atlas and axis.)†

(*vii*) ,, ,, invertebral substance.‡

(*viii*) ,, ,, spinal cord (effusion of blood, etc. ?).

(*b*) *Carotid Arteries.*—Condition of inner and middle coats ? Whether or not there are extravasations of blood on the walls or within the vessels ?

(*c*) *Brain and Membranes.*—Congested ? Extent of Vascularity ?

(*d*) *Larynx and Trachea.*—Congested ? Mucous froth ?

(*e*) *Heart.*—Right side full or otherwise ?

(*f*) *Lungs.*—Congested ? Emphysematous§ patches on the surface ? Apoplectic or bloody extravasations in the substance ?

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* The hyoid bone is the small horse-shoe shaped bone situated immediately beneath the tongue and above the larynx.

† The *atlas* and *axis* are the first and second vertebræ of the spinal column.

‡ The cartilaginous material or gristle placed between the vertebræ of the spinal column.

§ *Emphysematous* means pertaining to Emphysema, bloated, swelled. Emphysema of the lungs is an abnormal accumulation or collection of air in dilated air cells, or in the connective tissue framework of the lungs.

(*g*) *Stomach.*—Congested? Presence of food? Presence of poisons (such as opium, etc., given to drug the deceased, or for other purposes)?

(*h*) Are there any morbid appearances that would account for death, otherwise than by the hanging or strangulation?

(*i*) Has there been any disposition on the part of the deceased to commit suicide, or is insanity hereditary in the family?

For further cases of *hanging* consult:—

Recovery from, MEDICAL TIMES AND GAZETTE, July 1, 1854.

Recovery from, LANCET, November 1839. [2 vols.

Suicide or homicide from, TARDIEU, quoted by TIDY, pp. 403, 404, 406,

Murder with appearance of suicide, BECK, 566, TIDY, 404.

Case of Sarah Cornell, TIDY, 417, Vol. II, BECK, 571.

Case of Calas, BECK, 567, TIDY, 419.

Strangulation.

Reg. *v.* Pinckard, Northampton Lent. Ass., TAYLOR, Vol. II, 71.

Case of Gen. Pichegon, TIDY, 441.

Case of Sir Edmundbury Godfry, TIDY, 442. HARGREAVES *State Trials.*

CHAPTER III.

ASPHYXIA—SUFFOCATION.

Definition of suffocation—Various kinds of smothering—Suicidal suffocation—*Post-mortem* appearances in death from suffocation—Homicide by suffocation—Methods of homicidal suffocation—Suicidal strangulation with hair—Suffocation the result of certain diseased states—Smothering by sand—Abnormal causes of smothering.

Definition of suffocation.

SUFFOCATION means the exclusion of fresh air by other means than by external pressure of the throat (trachea). This definition would also include drowning, but the word suffocation is generally understood to imply exclusion of the air by covering the mouth and nostrils only. Tidy mentions, as the earliest instance of this kind of murder, the case as found in 2 Kings, viii, 15 : "And it came to pass on the morrow, that he (Hazael) took a thick cloth and dipped it in water, and spread it over his (Ben-hadad's) face, so that he died, and Hazael reigned in his stead." As a historical case of smothering, the case of the two young princes who were smothered in the Tower by orders of Richard III may be instanced.

Various kinds of smothering.

303. The most frequent cases of smothering in Europe are those of young children, suffocated by overlying. These cases are, however, by no means so common in this country. Cases of suffocation in a crowd are common, and in the case of persons in a state of intoxication, suffocation occasionally happens by a portion of the food or vomit obstructing the throat. In the case of Mrs. Gardner, which has already been quoted, although the deceased's throat had been cut, death was actually caused by suffocation, owing to the blood flowing into the air tubes. Children are often suffocated by swallowing hard substances, such as the nipple of a sucking bottle. Grown-up people have been suffocated by swallowing their false teeth during sleep, and Negroes are said to commit suicide by

doubling back their tongues and "swallowing" them (*sic*). Dr. Chevers says that a percentage of persons in this country are killed by swallowing living fish. This, he says, is an accident of by no means unfrequent occurrence amongst fishermen, who go about groping in the water to catch fish. It is not necessary that the closure of the air passage should be complete; partial closure is amply sufficient to produce suffocation.

304. Cases of suicidal suffocation are very rare, though there are some recorded cases of determined suicides, who have stuffed a ball of cloth into their *fauces* and so have caused death. Suffocation is generally the result of an accident, but it may also be the result of some internal disease, such as the bursting of certain internal abscesses, (*vide* paragraph 309, clauses (*i*) and (*j*)), or of the pressure of a tumour on the trachea. Suicidal suffocation.

305. The *post-mortem* appearances in death from suffocation are exactly those of asphyxia and need not be further described. Tardieu lays great stress on the existence of *punctiform** sub-pleural ecchymoses† ("Tardieu's Spots") as a sign of suffocation. They are considered to be due to small effusions of blood, ruptured during efforts at expiration, and are usually to be found at the root, base, and lower margins of the lungs. These spots, however, are not an infallible test, because they may not be found in indubitable cases of suffocation, and they have been found in cases of hanging and drowning; they have also been found by Dr. Ogston after death from scarlatina, heart disease, apoplexy, pneumonia,‡ pulmonary apoplexy,§ and pulmonary œdema.|| *Post-mortem* appearances in death from suffocation.

* Having the shape of minute points or dots.

† *Sub-pleural ecchymoses* are small patches of a dark red colour, lying beneath the pleura or covering of the lung.

‡ *Pneumonia* is inflammation of the true substance of the lung.

§ *Pulmonary apoplexy* is hæmorrhage into the air-cells of the lungs.

|| *Œdema* of the lungs is produced by a serous exudation into its substance.

Homicide by suffocation.

306. In this country it is probable that many cases of homicide by suffocation occur in the manner described in the Suriyana Kovil case, given in the last chapter; but as probably at the same time violence is used, death will result from other causes, such as strangulation combined with suffocation. The Resurrectionists, who killed persons in order to sell their bodies for medical examination, applied a plaster over the mouth and nostrils, and, in addition, applied pressure to the chest.

Methods of homicidal suffocation.

307. Chevers gives numerous instances of homicidal suffocation by filling the mouth with mud, sand, cloth, compressing the chest, and closing or covering the mouth and nostrils. In cases of this kind it commonly happens that the victim's testicles are squeezed. It is possible that this squeezing accelerates death by the shock caused to the nervous system and by the intense pain, whilst at the same time respiration is obstructed. He likewise gives the case of a boy who was throttled by the pressure of the knee on the throat. Many instances are recorded of throttling by stamping on the neck with the feet. A case is also recorded in which a man assaulted an aged woman, stamped on her neck, strangled, and, at the same time, broke her neck. An instance is also given in which strangulation was effected by using the flexible twig of the *dhak* tree, and another one in which strangulation was carried out by placing one bamboo on one side and a second on the other side of the neck and pressing the ends together.

Suicidal strangulation with hair.

308. Some cases of suicidal strangulation by females with long hair are recorded. A remarkable case is given by Chevers* in which an adult male was throttled by Thugs who, after the throttling, cut his throat, but he recovered—the cutting of the throat having probably relieved the congestion of the brain and lungs caused by the throttling.

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* *Medical Jurisprudence for India*, p. 455.

Suffocation the result of certain diseased states.

309. In connection with the subject of suffocation, it should be remembered that there are many diseased states which may bring it about, some rapidly, others slowly. Of such morbid conditions, we may, by way of illustration, mention the following :—

(*a*) Bleeding from the nose, or from wounds in the mouth and throat. In cases of cut-throat, where the windpipe is jagged or completely divided, a kind of valvular closure effected by the in-drawing of the lower cut end into the throat sometimes occurs.

(*b*) Scalds of the glottis and application of irritants to the fauces or glottis. These may produce sufficient œdema of the glottis to cause suffocation. (See a case of suffocation from the application of the acid nitrate of mercury to the throat, TAYLOR, Vol. II, p. 82). Œdema of the glottis may also result from kidney disease.

(*c*) Tumours pressing on the throat or fauces.

(*d*) The bursting of an abscess of the tonsils or of a pharyngeal abscess* (such as occurs in quinsy).

(*e*) The effusion of lymph or other morbid material into the trachea or about the *rima glottidis*† (*British Medical Journal,* Vol. I, 1881, p. 386).

(*f*) An accumulation (often great and rapid) of the bronchial secretion in infantile bronchitis.

(*g*) Acute double pleuritic effusion‡.

(*h*) Simultaneous œdema§ of both lungs.

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* A *pharyngeal abscess* is one occurring in the pharynx, usually at the back part of the throat, in front of the vertebræ.

† The *rima glottidis* is the chink or opening at the top of the air passages —the *glottis.*

‡ An accumulation of fluid (inflammatory or simple serous) in the cavities of both pleural sacs surrounding the lungs.

§ " Dropsy of the lungs."

(*i*) The bursting of an aortic aneurism into the windpipe or into a bronchus.

(*j*) The bursting of an abscess of the liver into the lung.

(*k*) Very copious and sudden hæmoptysis.*

(*l*) So called pulmonary apoplexy†. And here it is to be noted that diphtheria and some other diseases may cause a more or less complete paralysis of the muscles of deglutition (or swallowing), which would predispose to the occurrence of suffocation.‡

Smothering by sand.

310. We have, on two occasions, seen smothering by sand in the case of workmen on embankments and on the slope of a hill. Chevers gives two cases of death by "drowning in sand" from the falling in of high river banks. "The mouths were filled with sand, and the pharynx plastered with it. The larynx and the larger bronchi, œsophagus, and in one case the stomach, also contained sand. In one case it seemed as though the sand went furthest into the lungs, and in the other case into the stomach and alimentary tract."§

Abnormal causes of smothering.

311. An instance is mentioned|| of a sailor who vomited whilst drunk. In vomiting he inspired a lump of half masticated meat, which blocked up the opening into the lungs at the upper part of the neck (*rima glottidis*). We have seen cases in which bread, potatoes—and, in one instance, a piece of guava—produced suffocation. Chevers likewise relates the case of a boy who was suffocated from a living fish blocking up the glottis.

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* *Hæmoptysis* is the expectoration or coughing up of blood from the air passage.

† *Pulmonary apoplexy* is hæmorrhage in the lungs.

‡ TIDY's *Legal Medicine*, p. 451.

§ *Medical Jurisprudence for India*, pp. 449, 459, 461, 462.

|| CHEVER's *Medical Jurisprudence for India*, p. 617.

ILLUSTRATIVE CASES.

Case No. LX.—Accidental Suffocation.

(*a*) A groom was accidentally suffocated by falling into a quantity of hay through a hole in the hay-loft.

(*b*) A man was suffocated by the fall of some flour, which he was shifting from the upper to the lower part of a granary.—(Taylor.)

(*c*) Chevers gives a case in which fourteen coolies—men, women, and children—were suffocated by the falling in of a loft in which linseed was stored.

(*d*) Kenneth McLeod has given cases of persons suffocated by the falling in of a river bank, and also of drowning in sand and mud. Casper mentions a similar case of suffocation in sand. The sand was found adhering to the mucous membrane, as far down as the commencement of the bronchi.

Case No. LXI.—Homicidal Suffocation.

The following instances are taken from Chevers :—

One *Ramchoru*, of Goruckpore, was found guilty of rape upon a girl of eight. The child, who appeared to understand the obligation of an oath, declared that the prisoner threw her down and filled her mouth with sand.

Case No. LXII.—Homicidal Suffocation.

A boy was convicted of having robbed a child of four years of age, after having filled her mouth with sand and nearly strangled her. The child was found in a field with her mouth full of earth, and with the marks of fingers on her neck.

Case No. LXIII.—Homicidal Suffocation.

One *Bhageeruttee*, of Goruckpore, was sentenced to death for the murder of a boy of nine, for his ornaments. He confessed that he had put a cloth in the child's mouth, and, seizing the throat, had choked him.

Case No. LXIV.—Homicidal Suffocation.

Dr. Littlewood mentions the case of a woman who was suffocated whilst drunk, by forcing a cork into the larynx. The sealed end was uppermost, and there were marks of a cork-screw in the cork, rebutting the defence that the cork had slipped in as the woman was drawing it from the bottle with her teeth. Ribs were also fractured.—(Tidy.)

Case No. LXV.—Homicidal Suffocation.

Case of *Mary Campbell*, killed by Bourke and his companions. Suffocation was caused by pressure on the chest, at the same time compressing

the mouth and nostrils with one hand, the other being forcibly applied under the chin. At the *post-portem*, fifty-nine hours after death, the following appearances were observed :—Eyes closed and bloodshot. Face composed, but somewhat red and swollen. Excepting the face, no other lividity. Blood issued from the nostrils. Tongue normal. Slight laceration on the upper lip, opposite the eye-tooth florid points. *Os hyoides** and thyroid cartilage† more separated than normal but no external injuries apparent. Some marks of violence on the limbs.

Windpipe.—Normal, except that it contained a little tough (not frothy) mucous.

Lungs.—Normal.

Heart.—Right side full of black fluid blood.

Blood.—Black and fluid.

Abdominal Viscera.—Healthy, except the presence of incipient liver disease.

Brain.—Slightly turgid. Three extravasations on scalp.

Effusions of blood on the sheath of the spinal cord, and among the muscles of the neck, back, and loins.

Injury to the posterior ligamentous connection between the 3rd and 4th cervical vertebræ. (This probably occurred after death by doubling up the body.)—TIDY.

CASE No. LXVI.—SUICIDAL SUFFOCATION.

TAYLOR cites a case of suicide by a woman who placed herself under the bed clothes, and made her child pile numerous articles of furniture on the bed. She was found dead some hours afterwards.

CASE No. LXVII.—SUICIDAL SUFFOCATION.

OGSTON speaks of a servant girl who suffocated herself by shutting herself up in a trunk.

CASE No.—LXVIII.—SWALLOWING A COIN.

TIDY, amongst numerous other cases, gives one of a Mr. Brunel, who, in 1843, swallowed a half-sovereign which became lodged in the right bronchus, and at first caused great dyspnœa. For two days afterwards he experienced little inconvenience, but afterwards bad symptoms set in. Twenty-two days afterwards he was strapped in a prone position on a platform, made moveable on a hinge in the centre, by which means the head was lowered to an angle of about eighty degrees with the horizon. When in this position, the back of the chest was struck with the hand, violent choking symptoms resulting. Two days afterwards, being placed again in this position, tracheotomy was performed, but the attempt to

* The *os hyoides* is the horse-shoe shaped bone situated beneath the tongue.

† The *thyroid* is the prominent cartilage in the middle line of the neck, popularly called "Adam's apple."

grasp the coin through the wound failed. Sixteen days after this, the wound, having been kept open, he was again inverted and his back struck with the hand, when the coin, owing to an effort to cough, quitted the bronchus and fell out of the mouth.

Case No. LXIX.—Swallowing a fish.

A case is given in the *Indian Medical Gazette* (1874), in which a man swallowed a live fish whilst he was swimming. The fish was extracted, after some difficulty, as it had seized hold of the man's uvula (or "little tongue.")

Case No. LXX.—Suffocated by a live fish.

A man in the water having caught a perch, put it into his mouth, trying to hold the head with his teeth. It escaped, however, and jumped down the man's throat. Symptoms of suffocation set in, rendering tracheotomy* necessary. Death followed.

For other cases of suffocation consult—

Cases of Burke and Macdougall, Bishop and Williams. } *Ed. Med.* and *Surg. Journal*, April, 1829, p. 236. Tidy, 463, Vol. II.

Edin. Medical Journal, Vol. XX, p. 772. Tidy, Vol. II, 478.

* *Tracheotomy* is an operation for opening the windpipe by incision in the middle line of the neck.

CHAPTER IV.

SUFFOCATION FROM GASES—BURYING ALIVE—SUICIDES.

Suffocation from inhalation of noxious gases—Deaths from lightning—Burying alive—Burying alive of lepers—Witch-swinging—Burying alive of widow with her deceased husband—Murder by suffocation—Statistics of suicides—Causes of suicide—Physical suffering—Grief, shame, and anger—Revenge—Suicide from religious feeling—Suicide by *Suttee*—Method of investigation in cases of supposed suicide.

Suffocation from inhalation of noxious gases.

CASES of suffocation from inhalation of noxious gases rarely come before the criminal courts of this country. When such cases do occur, they are almost invariably cases of accident, as in the excavation of old wells, cleaning out of old cess-pools, inhalation of charcoal fumes, etc. In all these cases death occurs from asphyxia, and the *post-mortem* symptoms will be the same as those already described. Chevers mentions several cases in which women and children have been killed by sleeping in a closed room, in which charcoal was burning. In these cases death was caused by inhalation of carbonic acid. This same gas is engendered in old disused wells, especially if there has been an old accumulation of refuse at the bottom. It is generally supposed that a safe test is the lowering of a lighted candle or taper, and that if it burns, the air is not injurious. This test, however, is not a reliable one. It is certainly true that if the candle will not burn the air would be fatal to life, but the converse is not the case. By digging, especially amongst accumulated rubbish, at the bottom of a well or pit, a quantity of carbonic acid may become suddenly disengaged and prove fatal. Chevers mentions a case of some seamen who were suffocated by going into the fore-peak of a ship to execute some repairs. Here the bad air had probably been generated by bilge water. The fumes from a brick or lime-kiln are also

highly dangerous, and Taylor speaks of two boys who were killed by sleeping near a burning brick-kiln.

312. Deaths from lightning would seem to call for no remark, as they will rarely form the subject of a criminal enquiry. It may, however, be observed, that persons struck by lightning are often found with wounds exactly similar to those caused by a cutting instrument. The body also generally bears considerable ecchymosis. There will, however, frequently be marks of burning about the body or clothing, and damage to, or even partial fusion of, the metallic articles about the person. It often occurs that there are more marks of burning at the place of exit, than at the place of entry, of the electric current. Sometimes the bodies of persons killed by lightning present no external mark of injury. Deaths from lightning.

313. This practice has long been prevalent in India, and, indeed, in many other countries.* Among the mediæval monastic bodies in Europe, it is said that immuring alive was a not unfrequent punishment for unchastity, and the practice forms the subject of one of the Ingoldsby legends—Nell the Cook. It is said of the Begum Sumroo, the Native wife of Dyce Sambre, that she caused a slave girl, of whom she was jealous, to be buried alive, and then had her bed placed over the spot. Sir Thomas Roe, who visited the court of the Great Mogul in 1614, says that he was an eye-witness to an execution of a woman on account of an intrigue. She was buried alive up to the arm-pits. It is told of another native prince that he was in the habit of having prisoners, taken in war, buried up to the neck, and of then playing bowls, by rolling cannon-balls at their heads. Burying alive.

314. It was at one time a very common practice to bury lepers alive, and when these unfortunate wretches were in the last stage of disease, they would implore their sons or Burying alive of lepers.

* In Ancient Rome, Vestal virgins, who broke their vows, were thus punished.

relatives to dispose of them in this manner; indeed, they would threaten to curse and haunt them if they did not. It is possible that cases of this kind still occur, especially in wild uncivilized parts of the country. Harvey states that the victim is frequently buried in the sitting position, the head and neck being allowed to remain free, death taking place by exposure and exhaustion.

Witch-swinging.

315. In Rajputana, cases of burying alive were reported in 1868, and it is possible that this custom may still continue; for, in the Administration Report of 1882-83, it is stated that the equally barbarous custom of witch-swinging is still of frequent occurrence. When a woman is suspected of being a witch, she is either made to plunge her arm into boiling oil, or else her head is kept under water, whilst an arrow is shot from a bow and brought back to the place whence it was shot. If she passes through the ordeal, she is set free; if not, she is swung head downwards, until she either confesses or dies. If she confesses, she is killed. This same practice, of holding a person under water whilst an arrow is shot and brought back, is prevalent in the Hyderabad territory and amongst some of the hill tribes.

Burying alive of widow with her deceased husband.

316. Formerly, it was by no means uncommon for a widow to be buried alive with her deceased husband. Old travellers speak of this custom; and many cases of it, especially from among the weavers of Tipperah, are reported in the Parliamentary Blue Book as having happened in 1824 and 1825.

Murder by suffocation.

317. Chevers mentions a singular case of two young Hindus who inveigled a gumastah into their house at night and shoved him into a hole, and then, putting a board over him, which exactly fitted the grave, stood on it until he was suffocated. The body was found in a very decomposed state, but with no external marks of injury. Where persons are buried alive, death takes place from asphyxia, and the *post-mortem* signs will be exactly the same as in cases of suffocation.

Statistics of Suicides.

318. The subject of statistics of suicides is deserving of very careful attention. In medico-legal investigations in India it is frequently of the utmost significance to decide whether the death of a person found under strange conditions was caused by accident, suicide, or homicide. There are no hard and fast rules to guide us. Casper stated that "the exercise of a sound judgment, which is of far more value in medico-legal matters than all the subtleties of the ancient *medicina forensis,* must be our guide." For statistics and remarks on suicides and accidental deaths, see Section II, Chapter I.

Causes of suicide.

319. The causes of suicide in this country may be ascribed to—

Physical suffering.

(1) *Physical suffering.*—These are most common, and the usual form of the village and police report is : " So and so (a woman generally), unable to bear the pains in her belly, fell into a well and accidentally died." With reference to this subject, Dr. Woodford, quoted by Chevers, says that he has "long considered that the pain, low spirits, and weak health produced by the presence of *lumbrici** in the intestines in the rice-eating poor of Bengal, combine as a cause of suicide."

Grief, shame, and anger.

(2) *Grief, shame, and anger.*—These deaths call for no further remark, except that it frequently happens that a woman, after a quarrel with her husband, will either go and drown herself or attempt to do so. It often occurs that these attempts are nothing more than threats to make the husband give way. In the *Mahabharata* we read of the "chamber of wrath," to which a wife would retire, and where she would lock herself up, and remain divested of her jewels, refusing food until she got what she wanted. Cases present themselves in which, after a domestic quarrel, for a cloth or a jewel, the wife has run to the nearest well

* The *Lumbrici* here referred to are round worms (*ascarides lumbricoides*), frequently met with in the small intestines of the poorer classes. They are from four to eight inches long, and in appearance, much like ordinary earth worms.

and plunged into the water, exclaiming aloud that she would destroy herself. In these cases, however, it is found that the would-be self-destroyer descends the steps of the well, takes very good care not to go out of her depth, and makes no strong opposition against being taken out again. At the same time, it is by no means uncommon for a woman to really commit suicide after a severe quarrel with her husband, in which, perhaps, she has also been beaten.

Revenge.

(3) *Revenge.*—Suicide from revenge was of more common occurrence in former days than it is now. At one time the feeling was common, that a person by committing suicide caused his enemy to incur the guilt and responsibility of his death. There are many historical instances of this, but perhaps the most remarkable is the immunity which, owing to this feeling, the Rajputs, when acting as escorts, enjoyed from the attacks of robbers. If threatened with an attack, it was a point of honour with them to kill themselves, and their caste being a particularly high one, the guilt of their deaths rested upon the aggressors. The custom of sitting *dhurna,* punishable under the Penal Code, in which a person starved himself to death unless his demand was granted, is another example of the same feeling. Father Martin, quoted by Chevers, writing in 1709, says: "There is an old practice, which doubtless will surprise you, but it is certain those Indians observe the law of retaliation very strictly. If there happens to be a quarrel, and one of the parties pulls his own eye out, or is guilty of suicide, the other party must inflict the like punishment upon himself, or upon one of his relations. The women carry this barbarous custom still further: when any affront is put upon them, or reproachful word used, they will go and break their heads against the door of the offending person, who is obliged to inflict precisely the same punishment upon herself. If one woman poison herself, by drinking the juice of a venomous herb or plant, the other female, who was the cause of it, is obliged to do the same; and, should she fail

in it, the rest would set fire to her house, run away with her cattle, and be perpetually tormenting her till such time as she had made such satisfaction."*

Suicide from religious feeling.

(4) *Suicide from religious feeling.*—According to the *Ain Akbari,* quoted by CHEVERS, there are five kinds of suicide held to be meritorious in the Hindu, *viz.,* "starving; covering himself with cow-dung and setting it on fire, consuming himself therein; burying himself in snow; immersing himself in the water at the extremity of Bengal, where the Ganges discharges itself into the sea through a thousand channels, enumerating his sins and praying till the alligators come and devour him; or cutting his throat at Allahabad at the confluence of the Ganges and Jumna." To these might be added the custom which formerly prevailed at the Mahadeo Hills, also at Pachmarhin and Onkur Mandhalta, where men threw themselves from a perpendicular height of four or five hundred feet, and were dashed to pieces below, to fulfil the vows of their mothers. The practice of immolation under the wheels of a car was not confined to Juggurnath only, but used frequently to occur at the festivals of other pagodas. There is reason to believe that occasionally such cases of suicide occur at the present time. At all events, it is by no means an unfrequent occurrence that a man or a woman is crushed to death whilst the car is being dragged round the town. These cases are, of course, reported as accidents, but it is a coincidence that the sufferers are generally old and decrepit. Chevers says:—"On the 7th July 1864, the editor of the *Friend of India* mentions that a few days previously he had seen, near

*NOTE.—Of the same nature was the old Hindu practice of the *Koor.* This custom was formerly made use of to intimidate the Government officers from enforcing a demand. A circular pile of wood was prepared and on it was placed a cow, or sometimes an old woman, and the whole were burnt together. These old customs, which were the only weapons of the weak against the strong, and which show, more than anything else, the abject subjection of the masses to those in power, are now for the most part obsolete, but the tradition of them remains; the feeling which prompted them is probably still to be found, and they are therefore liable to crop up again from time to time.

Serampore, two persons crushed to death, and another frightfully lacerated, having thrown themselves under the wheels of a car during the Ruth Jatra festival. It was afterwards stated that this occurrence was accidental. The fact and its explanation must stand on record together."

Suicide by *Suttee*.

320. The custom of *Suttee* is by no means confined to women. The earliest instance of male *Suttee* is to be found in the *Ramayana*. King Dasarath, when dying, after Rama had gone into banishment, tells his favourite wife of an adventure that had happened to him when a boy. He said, that whilst out hunting, he had, by accident, shot the son of a blind old ascetic whilst the son was drawing water for the father's use. After the accident had been discovered, the ascetic burnt himself together with the body of his son, and at the same time foretold that when Dasarath should come to die he should feel the same sorrow at being separated from his son. At various times, numerous other cases of self-immolation by males have been recorded. They are of rare occurrence, and are confined generally to visionaries. It not unfrequently happens that these persons, previous to committing suicide, kill their own families. Of female *Suttee*, it may be remarked, that even at the present day, cases are occasionally reported. In the Administration Report of Rajputana for 1882-83, the Agent reported that one case of female *Suttee* occurred during the year.

Method of investigation in cases of supposed suicide.

321. In the investigation of cases of supposed suicide, it is absolutely necessary to adopt some methodical course, and in this respect the following table may be of service :—

(1) Has the deceased made any oral statement or left any written declaration of his intention to commit suicide ?

(2) Has there been any marked peculiarity in the conduct and manner of the deceased to point to any mental derangement ?

(3) Conditions under which the dead body was found—

(*a*) If in a room, was the door locked on the inside ?

(*b*) Position of the hand with regard to the weapon alleged to have been used.

(*c*) If weapon be found firmly grasped in the hand, probability is in favour of suicide, as weapons placed in the hand after death to simulate suicide can be removed with ease, even when the *rigor mortis* is present.

(4) Nature and character of the wounds found on the body. On suicides, incised and punctured wounds are generally found—seldom lacerated wounds, unless a jump from a height has been the means adopted to cause death.

(5) Evidence to be derived from a medico-legal examination of the body—

(*a*) Do the wounds correspond with the weapon alleged to have been used ?

(*b*) Examination of stomach for poison.

Why ? Persons may have been poisoned first, and then cut about the body after death.

(*c*) Direction and course of wound.

(*d*) Were the wounds inflicted during life ?

CHAPTER V.

SUN-STROKE, LIGHTNINGSTROKE, STARVATION.

Results of excessive heat—Temperature of human body—Death from heat—Effect on system of exposure to heat—Sun-stroke—Lightning-stroke—Chronic starvation—Symptoms and signs of chronic starvation.

Results of excessive heat.

EXCESSIVE heat may produce death. Sunstroke, heat-apoplexy, or *coup de soleil,* is one of the results of heat acting upon the nervous tissue and cells of the brain and spinal cord, and upon the heart.

Temperature of human body.

322. The temperature of the human body in health, taken in the mouth or axilla, averages 98°6 F. In the rectum or vagina it is usually about 1° higher. In many diseases the temperature of the body rises considerably: thus a temperature of 106° F. is common in severe agues; 113° F. has been recorded in typhoid fever, and 115° F. in a case of scarlet fever. Death is inevitable if the temperature of the body rises and remains for any length of time 12° F. above the normal.

Death from heat.

323. Death from heat frequently occurs without direct exposure to the sun. According to Dr. H. C. Wood, it may occur in three ways—*viz.,* (1) from exhaustion or collapse; (2) from thermic or heat fever; and (3), in rare cases, from meningitis or phrenitis (inflammation of the substance of the brain).

Effect on system of exposure to heat.

324. The principal circumstances which modify the effect on the system of exposure to heat are:—

(1) The amount of moisture present in the atmosphere. Other things being equal, the less this is, the better exposure to heat is borne. The presence of a large amount of moisture in the atmosphere interferes with evaporation from the surface of the body, and favours the action of heat on the system.

(2) *Length of exposure.*—Very high temperatures can be borne for a short time, but not for long, without ill effects. Chabert, the "Fire King," was in the habit of entering an oven, the temperature of which was from 400° to 600° F.; the air, however, was absolutely dry.

(3) *Habit.*—This appears to a certain extent to lessen the effect of exposure to heat. Individuals accustomed to carry on their daily work in an atmosphere of high temperature apparently withstand the action of heat better than others.

(4) *Bodily condition of the individual.*—The action of heat on the system is favoured by exhaustion, indulgence in alcoholic liquors, or anything which checks elimination or embarrasses the normal working of the organic system.*

325. The medico-legal importance of the subject of sun-stroke arises out of the fact, that the unconsciousness which one of its varieties produces, may be mistaken for the insensibility caused by other diseases, or by accidents and certain poisons. The general symptoms and signs of sun-stroke are conveniently considered as follows:— Sun-stroke.

Sun-stroke may be described as acute poisoning of the nerve-centres with superheated blood, the resulting phenomena being an acute paralysis of the nerve-centres, generally implicating principally the centres of respiration and of heart-movements. Sunstroke occurs from exposure to the direct rays of the sun in tropical climates, and more especially among those who have the head uncovered or imperfectly covered. Also from fatigue during the heat of the day in a tropical climate; over-exertion; over-crowding; and intense tropical

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* Tidy's *Legal Medicine*, Vol. I, p. 435.

heat during calm weather. In sunstroke, the affection is sudden, and there may be no premonitory symptoms; but in heat-apoplexy the accession of symptoms is gradual. Two chief clinical forms are recognised—the cardiac and the cerebro-spinal. In the former, the course is rapid and the issue fatal, almost from the necessity of the case; in the latter, there is far more chance for life, and, at any rate, the end does not come so soon. In the cardiac variety, there may be no preliminaries whatever. In the cerebro-spinal variety, which is the commoner, there is usually a distinct train of preliminary symptoms. Very commonly there is mental derangement, usually of the nature of hallucinations; the patient is more or less delirious; and occasionally he becomes dangerously furious and homicidal or suicidal. After a short time he becomes drowsy and lies down; he rolls about uneasily, and there is a constant desire to micturate; he then passes into a state of coma with stertorous breathing and gradually increasing insensibility. In some cases there are convulsions, but in others the patient lies motionless and expires.

Lightning-stroke.

326. Injury or death from *lightning*-stroke, or the sudden discharge of atmospheric electricity, occurs in India as elsewhere. In His Highness the Nizam's Dominions several deaths from this cause have been recorded during the last two years. In one case that occurred some years ago in the military cantonment of Trimulgherry, an officer was killed by lightning whilst playing billiards. Persons have been struck whilst in bed, under trees, or even in the open. Some people if caught in a thunderstorm seek shelter and safety under trees, under the impressions (1) that the electricity is conveyed into the ground by the tree, or (2) that they are in much greater danger in the open. This is an erroneous supposition.

327. Chronic starvation is, perhaps, the best place in which to briefly allude to the subject of starvation. From a medico-legal stand-point, it affords but little interest? although every now and then cases arise in which parents or others having charge of children are accused of neglecting their duty in this respect and depriving their children of adequate or sufficient food. A strange case of this kind was recently tried in the Court of the Residency Bazars, Hyderabad. A boy, twelve years of age, died of chronic dysentery, Surgeon-Major E. Lawrie and Surgeon P. Hehir having (after performing a *post-mortem* examination and finding extensive ulceration of the whole of the large bowel) given a certificate to this effect. The father was arraigned on the charge of having caused death by starvation and neglect. The judge held that there was no evidence against the accused and dismissed the case.* Chronic starvation.

328. The conditions resulting from chronic starvation are—(*a*) emaciation and loss of bulk; (*b*) disappearance of the subcutaneous fat and in females absorption of the mammary glands (breasts); (*c*) anæmia; (*d*) swollen and ulcerated gums (this condition of land scurvy occurred in a large proportion of cases noted by Surgeon-Major (now Surgeon-General) Cornish during the famine in Southern India in 1877); (*e*) great tendency to ulceration and sloughing in the receipt of slight injuries; (*f*) anasarca † (in a considerable number of cases); (*g*) dry scurvy, with pigmented patches on the skin; (*h*) bristly discoloured hair; (*i*) an aspect of great hebetude and depression; (*j*) a crouched attitude, the limbs being gathered in on a sunken abdomen.‡ Symptoms and signs of chronic starvation.

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* The ultimate effects of chronic dysentery would be similar to those of starvation, because this disease produces morbid changes in the mesenteric glands (which assimilate and elaborate the food and fit it to enter the blood), which changes materially interfere with the assimilation of food.

† *Anasarca* or "dropsy" of the subcutaneous cellular tissue.

‡ *London Medical Record*, 1879, p. 170.

SECTION III.–OFFENCES AGAINST CHASTITY, INFANTICIDE AND FŒTICIDE.

CHAPTER I.

RAPE.

Rape—Examination in case of rape—Traces of, on adults—On children—Blood-stains and spermatozoa—Marks of apparent venereal disease apt to be misleading—Injuries caused by a rape on a virgin—Age when Native girls reach puberty—Age when European girls reach puberty—Difference between English and Indian law—Previous character of woman—What constitutes rape.

RAPE is defined as the "carnal knowledge of a woman against her will."

Rape.

329. Charges of rape are very common, and, as in Europe, the charge is frequently falsely made. Such charges are rarely established by eye-witnesses, and the conviction or acquittal of the accused will, therefore, in a great measure, depend upon the statement of the woman, her examination, and also upon the examination of the accused.

Examination in case of rape.

330. The investigation as to the circumstances connected with an alleged charge of rape should he carried out methodically. The terrible results of the Bombay Rajabhai Tower Tragedy are still fresh in our memories, and point to the urgent necessity of noting every fact that is likely to help in the slightest degree the demands of justice. The following tabulated scheme for conducting such an inquiry will be both interesting and useful :—

A.—Examination of the Female.

I.—We should record—

(*a*) The date and hour when the female first made complaint, and the precise words employed by her at the time.

(*b*) The persons by whom she was accompanied.

(*c*) The general behaviour of the female—whether her statements were apparently made under compulsion, or were in any measure dictated by those accompanying her.

(*d*) The general feeling of those accompanying the female—(1) towards herself, and (2) towards the accused.

(*e*) Any further remarks made by the female or her friends.

NOTE.—If the medical jurist be directed to visit the female for purposes of examination, it is advisable that he should not give notice of the precise time of his intended visit, in order to avoid preparations being made for it.

II.—Enquire as to—

(*a*) The age of the female.

(*b*) The *date* and exact *time* when the rape was said to have been committed.

(*c*) The place where it occurred.

(*d*) Whether she uttered any cries, or was too terrified to do so.

(*e*) The exact circumstances under which the rape was committed (as, for example, whether the parties were standing or lying on the ground, etc.)

(*f*) Whether or not the female was menstruating at the time.

(*g*) Whether she was sensible during the whole time that the offence was committed.

NOTE.—Avoid all leading questions, more especially in the case of children.

III.—Note—

(*a*) Whether the female exhibits any signs of narcotism, or of intoxication, or otherwise

of drugging. (This detail will be of no avail unless the person be brought for examination immediately after the rape was committed.)

(*b*) Whether the female walks as if in pain.

(*c*) Whether she appears of robust constitution, or whether there are signs of deteriorated health, or of scrofula, anæmia, malarial cachexia, etc.

(*d*) Whether she has the general appearance of a person addicted to self-abuse or masturbation.

NOTE.—Having remarked on these points and made sufficient general inquiries, let the female be undressed. Institute a thorough investigation, with professional assistance, if possible.

IV.—Examine the clothes worn at the time of the alleged rape, and preserve such portions as may be necessary for microscopic examination for—

(*a*) Blood.

NOTE.—Note if the stains are uniformly red, or marked by want of uniformity, suggestive of the admixture of blood with mucus.

(*b*) Semen.

(*c*) Other discharges.

(*d*) Mud, dirt.

NOTE.—Note if any of the clothes worn at the time of the alleged rape are torn, and if so, the position of the rents. Record further if there are any indications of the clothes having been very recently washed.

With respect to stains it may be remarked.

(1) That the presence of a blood-stain does not prove connection against the consent of the female, nor that the injury, even supposing the blood to have come from the genitals, was the result of violence from intercourse. Such injury might arise from the introduction of a foreign body, or of the fingers, or be due to menstruation. Conversely,

the *absence* of blood-stains, moreover, does not prove that the charge of forcible rape is untrue.

(2) That the presence of a seminal stain on the garments of the female is strong presumptive evidence that a rape, or an attempt to rape, has been committed, although it by no means fixes the crime on any one individual. The *absence* of seminal stains is no proof that the charge of rape is unfounded.

(3) That with respect to stains arising from other discharges, it is practically impossible to differentiate the character of a discharge (*i.e.*, whether it be gonorrhœal, leucorrhœal,* etc.) by the appearance of the stain.

(4) That it is most important to compare mud stains that may be found on the clothes of the accuser with mud stains existing on the coat or trousers or other garments of the accused; and further, to compare both with the earthy matter found at the precise spot where the assault was said to have been committed.

V.—Whether the breasts are virginal, or show signs of having been manipulated, etc.

VI.—Carefully examine and record all general *injuries* or marks of violence on the body of the female.

Note with respect to such general injuries—

(*a*) Their character, size, and exact position.

(*b*) Their probable age.

(*c*) How far they coincide with the story told by the victim.

(*d*) Whether the injuries could have been self-inflicted.

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* *Leucorrhœa* is a white or mucous secretion of the vagina arising from a morbid state of that passage.

(*e*) Whether they could have been inflicted by others for a malicious purpose.

NOTE.—Marks of general violence constitute most important evidence. It should be carefully considered whether the marks of injuries correspond or not with the alleged cause.

VII.—Carefully examine and record the appearance in detail presented by the genital organs :—

A.—External genital organs.

Note—

(*a*) The presence of swelling, redness, tenderness, bruises, wounds, laceration, etc.

(*b*) Whether the vulva,* or the hairs on the vulva, show any appearance of being matted or clotted. (If this be the case, the hairs are to be cut off and preserved for microscopic examination.)

(*c*) Whether any dried blood-stains on the genital organs are visible.

(*d*) Whether there is any external sore on the genital organs.

(*e*) The probable date of the several injuries observed.

B.—Internal genital organs.

Note—

(*a*) Is the perinæum† or fourchette‡ lacerated ?

(*b*) Is the hymen ruptured or inflamed ?

(*c*) Are the carunculæ§ apparent, and if so, what is their condition ? (*i.e.*, are they small and colourless, or large and inflamed ?)

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* The *vulva* is the opening into the vagina.

† The *perinæum* is the mass of tissue between the anus and external genital organs.

‡ The *Fourchette* is a small fold connecting the labia of the vulva in the female.

§ The *Carunculæ* referred to are small fleshy remains of the ruptured hymen usually three in number.

(*d*) Is the vagina* narrow and rugose?

(*e*) Is there any sign of disease, such as noma,† etc.

(*f*) Are there any syphilitic sores?

(*g*) What is the probable date when the injuries noted on the female were inflicted?

If the existence of syphilis or gonorrhœa be indicated, inquire—

(*a*) All particulars as to time, date, etc.

(*b*) Whether the female has been exposed to the possibility of infection otherwise than by intercourse?

NOTE.—If there be extreme tenderness and swelling, make as full an examination as possible at the time, postponing a more complete examination until the swelling has subsided.

Supposing marks of violence on the genitals are found—

(1) Consider whether such marks may result from masturbation, or be self-inflicted, or result from the introduction of foreign bodies, etc., or be inflicted by others for a malicious purpose.

(2) That, given signs of non-virginity, intercourse is not necessarily established because marks of violence be present.

(3) That, given marks of injury caused by intercourse, such intercourse may have been by consent.

(4) As a rule, therefore, the medical jurist should content himself with merely stating the marks observed by him, without stating their cause.

Supposing no marks of violence on the genitals be found—

(1) Consider whether the interval since the crime was said to have been committed is sufficient to explain the disappearance of such marks.

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* The *vagina* is the passage from the vulva to the womb.

† *Noma*, a corroding disease, often attacking the mouth, and also the external genital organs, of female children.

(2) If the examination be conducted immediately after the crime was said to have been committed, and the victim be of tender years, the absence of all marks of genital injury is strong presumptive evidence that a rape has not been committed.

(3) On the other hand, if the victim be accustomed to sexual intercourse, the absence of marks of injury on the genitals is no certain proof that a rape has not been committed.

VIII.—Examine carefully any discharge from which the female is suffering, remarking its character (*i. e.*, whether it be thick or purulent, etc.), its quantity, its probable source, etc.

Enquire—

(*a*) Whether the female suffered from any discharge previously to the alleged rape having been committed; and

(*b*) If not, how soon afterwards did the discharge occur? (Supposing a discharge be present, the question will be all-important whether the accused is suffering from gonorrhœa.) The medical jurist should not commit himself to a statement as to the exact nature of the discharge.

At the *post-mortem* where death has occurred from rape—

(1) Examine the body generally for injuries (bruises, fractures, etc.)

(2) Examine the mouth for foreign bodies.

(3) Examine the genital organs.

With respect to injuries consider—

(*a*) Are they such as to indicate that a rape has been committed?

(*b*) Are they sufficient to have caused death?

(*c*) Might the injuries have been caused by malicious design after death?

(4) Examine the vaginal secretions, the pubic hairs,* the vulva, etc., for spermatozoa.†

(5) Are there any *post-mortem* appearances by which the death might be accounted for, other than those resulting from rape?

B.—EXAMINATION OF THE ACCUSED.

Note—

(*a*) His size, strength, and general development, in comparison with those of the accuser. Is he impotent or not?

(*b*) Marks of scratches, etc., on the face, hands, penis, and body generally.

(*c*) The condition of the frænum,‡ the presence of seminal fluid in the urethra,§ and of the smegma|| around the glans,¶ etc.

(*d*) Rents in, or stains of blood, semen, mud, etc., on the clothes.

(*e*) Whether the marks on the accused correspond or not with those on the accuser.

(*f*) Whether the stains of mud or dirt, etc., on the clothes or boots of the accused, correspond or not with what might have resulted from a struggle at the spot indicated by the accuser as that where the alleged crime was committed.

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* *Pubic hairs.* The external region of the organs of generation which after puberty is covered with hair.

† *Spermatozoa* are minute bodies, discoverable by the microscope in the semen, and constitutes the male germ.

‡ The *frænum* is the band of fibrous and mucous tissue attaching the prepuce or foreskin to the "head" or gland of the penis.

§ The *urethra* is the channel of the penis.

|| The *smegma* is the offensive sebaceous or greasy matter secreted by the little glands situated beneath the prepuce.

¶ The *glans* or *glans penis* is the "head" or extremity of the penis naturally covered by the foreskin.

(*g*) Whether the accused be suffering from gonorrhœa or syphilis. If he is not, and the accuser is, or if he is and the accuser is not, such evidence is most important.

C.—EXAMINATION OF THE SPOT WHERE THE CRIME WAS SAID TO HAVE BEEN PERPETRATED.

Note—

(*a*) Whether the ground shows any marks indicative of a struggle.

(*b*) Whether any articles of jewellery, dress, etc., can be found on the spot where the rape was alleged to have been committed, such as might lead to identification or otherwise be important as evidence.

(*c*) Whether the character of the mud or other materials likely to cause marks on the clothes (such as paint, tar, etc.) correspond with marks actually found on the garments of the accuser or of the accused.*

Traces of injury on adults.

331. It seems to be admitted that, for an ordinary sized man to commit a rape upon a full grown woman, without leaving traces of other injury on her person, is next to impossible. Of course, it is possible that a rape may be committed after the woman has been stupefied or intoxicated.

Case of rape at age 47.

332. Casper, amongst many other cases, gives one of a false charge made by a married woman of forty-seven years of age, which is given *in extenso* (Illustrative Case No. LXXI).

Defloration not sufficient proof of rape.

333. Mere proof, on examination, that the woman has lately been deflowered, is, of course, not sufficient to prove that the accused committed a rape upon her, or that she has, indeed, been deflowered by sexual connection. In this country, where it rarely happens that a woman who has arrived at puberty remains unmarried, the question of

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* TIDY'S Legal Medicine, pp. 217 *et seq.*

defloration will probably not arise if the charge is made by a grown-up woman. If the woman is married, and has been accustomed to sexual intercourse, it is not to be expected that mere penetration, unless accompanied with considerable violence, will leave any traces, especially two or three days after the act. On the other hand, it is improbable that a grown-up woman could be raped without there being some traces of injury. Rape, however, can occur when the woman has been induced to give her consent by intimidation or under a mistake.

334. The majority of charges of rape are made by, or on behalf of, young girls, and very considerable caution must be exercised in the enquiry into such cases. In a great number of cases it will be possible to decide, from the child's manner, whether she has been tutored or not, and it must be remembered that marks of defloration, such as the rupture of the hymen and marks of blood, are not sufficient to establish a rape.

Caution necessary regarding charges of rape on young girls.

335. In the examination of the linen for blood stains mistakes may arise from—

Examination of linen for blood.

(*a*) The garments being intentionally soiled with blood. This is not infrequently done in cases of false accusations.

(*b*) The menstrual discharge may be readily mistaken for that due to violence, as the two kinds of blood cannot be distinguished.

(*c*) The red juice of fruits and grease-spots has been mistaken for marks of blood and seminal stains on linen.

336. One of the first points which should be enquired into is—the caste and position of the child's parents. Where they are of respectable position and caste, it is most improbable that they would concoct a false charge of this kind; but if the mother is an abandoned character, such a concoction is by no means improbable. Chevers records several cases in which prostitutes have deflowered

Caste and position of child's parents.

their own daughters by mechanical means, in order to make subsequent connection with a man easy and painless. It is true that these means are generally gradual, but in the case of a dissolute woman, who wanted to wreak a revenge upon a man, it would be by no means impossible for her to rupture the hymen of her child with such violence as would leave traces of injury, and then to tutor the child to bring a false complaint.

Blood stains and spermatozoa.

337. Blood stains are important only if they have been subjected to medical examination, in which case, if spermatozoa are found, they must have taken their origin by sexual connection. It is to be remembered that blood stains are frequently absent in rape committed on young children, although they are always to be found in adult-virgins at the time the rape was perpetrated, when the vessels of the hymen are ruptured. Casper's experiments go to show that it is by no means an invariable rule that spermatozoa are found in male semen, especially when the man is advanced in age. When, however, spermatozoa are found, it is an undoubted proof that there has been sexual connection with a man, and if the girl is below the prescribed age, this would be sufficient to constitute the fact of rape.

Destruction of the hymen.

338. Destruction of the hymen is frequently to be found, especially in young girls, and one or several lacerations of the hymen may be visible. As these tears soon heal, they must be looked for within a week of the occurrence of the alleged offence, otherwise no reliable opinion can be expressed with regard to the time of their infliction. It should not be forgotten that similar lacerations may be produced by the introduction of foreign bodies to substantiate a charge of rape. Dilatation of the vagina may be produced by the passage of hard bodies in order to support a false charge. Casper recorded a case in which the mother of a girl of ten years of age had gradually dilated the vagina of the child with her fingers in order to fit her for sexual intercourse with adult males.

Marks of apparent venereal disease apt to be misleading.

339. Charges of rape are frequently established by proving that the man is suffering under a venereal complaint, and has infected the girl or woman; but great caution should be exercised even in cases where it is proved that the woman is suffering from an apparently venereal discharge. Casper points out that, especially amongst young children, there is often a *muco-purulent* secretion* from the mucous membrane of the vagina, of a greenish-yellow hue, which, neither in colour nor consistence, is to be distinguished from the usual discharge of the earlier stages of gonorrhœa. This appearance, he says, is extremely important, since it is almost constantly found, especially and particularly in children, from the twelfth to the fourteenth year, when the genitals have met with any violent usage. This discharge may, however, be only from the vagina and not from the urethra, and may simply be the result of injury and not of a venereal disease. Again, there is a discharge due to catarrh,† scrofula, vaginal leucorrhœa (or "whites"), caused by worms or by uncleanliness, which might be mistaken for gonorrhœa. Regarding this discharge, Taylor remarks: "It is frequently met with in girls up to six or seven years of age, and children thus affected have been tutored to lay imputations against innocent persons for the purpose of extorting money. This state may commonly be distinguished from the effects of violence, either by the hymen being entire, or by the non-dilatation or laceration of the vagina or perinæum,‡ by the red and inflammatory condition of the mucous membrane, and the abundance of the purulent discharge, which is commonly much greater than that which takes place as a mere result of violence.

False charges of rape.

340. Capuron mentions two cases in which charges of rape on children were falsely made against innocent persons on account of the existence of purulent discharge, the

* *Muco-purulent* is a mixture of mucous and pus.

† *Catarrh of the vagina* is a slight inflammation of that passage, associated with a mucous or muco-purulent discharge.

‡ The *perinæum* in the female is the bridge of tissue situated between the lower extremity of the vagina and the anus.

nature of which had been mistaken." It is, therefore, most desirable that a medical opinion should be obtained regarding the nature of such a discharge, and, when examined, the witness should be asked what means he had adopted to convince himself that the discharge was a gonorrhœal one. On the other hand, it must also be remembered that discharges from the male organ are not always venereal, but may sometimes be due to urethral catarrh, etc. A careful examination of the man should also be made, and the mere fact of a stain on a man's cloth should not be taken as a proof that he was suffering from a venereal complaint. Of course, where it is indubitably proved that the man is suffering from a venereal complaint and that the woman is suffering from a similar disease, this would be strong corroborative proof of the woman's statement—if otherwise credible—that connection had taken place between them; and in the case of young girls below the prescribed age, such evidence has been sufficient to obtain the conviction of the accused of rape. In all such cases, however, care must be taken to prove (1) that the disease is a venereal one; and (2) that the diseases under which the accused and the female are suffering are of the same nature, and note that the time after which the disease appeared should be ascertained.

341. The following details give comparatively the physical signs of rape in the *adult* and in the *child*:—

I.—In the *adult*—

(1) If examined soon after the commission of the offence, the hymen of the adult virgin may be ruptured, the fourchette may be lacerated, and the parts covered with blood.

(2) Difficulty in walking, in passing water, and sometimes when the bowels are relieved. These signs in the adult pass off in a day or two.

(3) Injuries on the person abused, such as scratches and ecchymoses, may be present as the result of a struggle. These may be self-inflicted.

II.—In the *child*—

(1) There may not be sufficient penetration to rupture the hymen, consequently there will be no hæmorrhage. In other cases the external organs will be bruised, and in many cases severely lacerated, the lacerations depending on the amount of penetration and force used.

(2) Same as in the adult, but lasting for a longer time—from eight to fourteen days.

(3) For obvious reasons, these do not occur on children.

Injuries caused by rape on a virgin.

342. As regards the injuries caused by rape on a virgin, it should be remembered that, especially with young girls, one or several *lacerations* of the hymen* are more frequently found than a complete destruction of it. This is a point upon which Casper, whose experience in such matters was very great, insists most strongly. "In little children," he says, "the hymen is almost never found destroyed," even when the male organ has been inserted. It does not, therefore, follow that a charge of rape is false because the hymen in a young girl is found undestroyed.

Signs of rape in the dead.

343. In the case of a woman found dead, the question may arise as to her having been violated prior to death. The reply to the question is by no means easy. Severe injury to the genitals is a presumption in favour of rape. The presence of spermatozoa in the vaginal mucus is good evidence of a late coïtus, but is no direct evidence of rape. Collateral evidence will in most cases decide the point.†

Death from hæmorrhage after rape.

344. In the *Indian Medical Gazette* of 1st November, 1875, page 284, Surgeon-Major R. Harvey relates the circumstances connected with cases of death from hæmorrhage after rape. In one case, a girl, nine years of age, was raped by an adult. There was pain and considerable loss of blood caused by the introduction of the male organ. The left

* The *hymen* is a thin membrane, extending across the vagina at its entrance, semi-lunar, circular, or irregular in form.

† HUSBAND'S *Forensic Medicine*.

wall of the vagina was ruptured, from the orifice upwards, for $2\frac{1}{2}$ inches, and the rent was an inch wide.

Age when Native girls attain puberty.

345. As regards the age when Native girls attain puberty in this country, Chevers has collected some valuable information. He speaks of one case, mentioned to him by Dr. Chuckerbutty, in which a girl became a mother at *ten* years of age. In this case the doctor had known the girl from infancy, and could therefore speak with certainty regarding her age. Chevers says that menstruation* at ten years is very uncommon, and does not probably occur in more than one or two cases out of a hundred females. He also remarks, that females in indigent circumstances menstruate later than those who are well nourished. Amongst the former, he never observed a case of menstruation earlier than twelve years, but girls in good circumstances begin to menstruate at eleven years of age.

Age when European girls attain puberty in India.

346. As regards the menstruation of European girls in India, Fayrer has given the ages at which twenty-seven girls in the Calcutta European Orphan Asylum began to menstruate. They were all of pure European lineage. The earliest age was twelve years and two months in a girl born in India. Of the whole number—

Four	commenced	between	12—13	years of age.
Eight	,,	,,	13—14	
Nine	,,	,,	14—15	
Five	,,	,,	15—16	
One	,,	,,	16—17	

Marriage of Native girls.

347. It is almost superfluous to remark, that although Native girls are married very young in this country, they continue to reside in their parents' house until their first menstruation, after which they are sent to live with their husbands.†

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* *Menstruation* is the monthly discharge of red bloody fluid from the womb, beginning, as a rule, about the age of puberty and continuing as long as the function of child-bearing lasts.

† A case was related by Dr. Cullen of an European woman, mother of a large family, who was a mother at the age of 13 years.

348. As regards the male, there is a difference between the English and Indian Law. In England there is an irresistible presumption of law, that a boy under fourteen cannot commit a rape. In this country no such limit of age is fixed, and the physical capacity is a matter which can be proved. As a matter of fact, a boy of ten years of age has been convicted of rape on a girl three years old, but in this case he was punished for a misdemeanour only (MAYNE).

Difference between English and Indian Law regarding rape.

349. In a charge of rape, evidence of the woman's previous bad conduct cannot be brought, unless she herself has been questioned on the point. The remarks of Mr. Mayne, ("Commentaries on the Indian Penal Code") as regards this seem to be somewhat contradictory. In the tenth edition, page 299, he says: "Although the prosecutrix may be asked, on cross-examination, whether she has not had illicit connection with other men, *her answer is final, and evidence to contradict her is inadmissible.** But on the following page, he says: "The badness of her character is, however, a very important element in deciding whether she was violated, *or* whether she voluntarily consented to the act. Hence the prisoner *may always adduce evidence of her notorious want of chastity*, or of her having had illicit intercourse with himself, *or with other men*;* but it would seem, that evidence of such particular facts cannot be given, unless the prosecutrix has been cross-examined upon this point." We should not notice this contradiction, except that Mr. Mayne is so great an authority, that either passage might be adduced as an argument.† There seems to be a difference in cases of rape to cases as regards which the ordinary rules of character are in force. As a general rule, evidence of a man's previous bad character cannot be produced against him, unless he has first cited evidence of good character. But it is manifest that a woman in the witness-box, swearing to a charge of rape, is in a very different position to a prisoner whose statement is not recorded on oath. She is a witness, and the general rule, that

Woman's previous conduct does not affect charge of rape.

* The italics are the Authors'. † See note at end of this chapter.

evidence may be brought to discredit a witness's statement, must apply. It is clear that, supposing there has been an actual connection between the woman and the accused, and she says that it is a case of rape, she at once puts the prisoner at a disadvantage if she swears she has never had previous connection with him, and he is not allowed to produce evidence to rebut this statement. The denial by the woman of any previous illicit intercourse, *is, in fact, an assertion of good character,* and this having been asserted, the prisoner can disprove it.

Woman's statement in charge of rape must be received with great caution.

350. The charge of rape is one so easy of assertion and so difficult to disprove, that the utmost caution must be observed in crediting the woman's statement. She should be carefully cross-examined, and her statements should be tested in every possible manner, and especially so when she is of bad character. Of course, a woman of previous bad conduct may be the subject of a rape. Casper gives a case of a servant girl who was clearly proved to have been previously deflowered, but who was attacked by some robbers, who entered the house and raped her under the most brutal circumstances. But where a woman has been surprised in the act, even though she has previously borne a good character, the accusation of violence, to save her own reputation, is so easy to make,—and one, which, if she has presence of mind, she can, by a scream, so easily simulate,—that evidence of her previous intimacy with the accused should always be allowed, if she denies it on cross-examination. This evidence need not necessarily be conclusive against her statement, but should be considered by the judge in weighing the probabilities of the case.

Presumption in favour of woman in charge of rape.

351. So much latitude is allowed to the prosecutrix in such charges in this country, that the prisoner would be at a complete disadvantage if he were not allowed this opportunity of replying to her evidence. In charges of rape, the ordinary rules of hearsay evidence are entirely set aside, and not only is the woman's statement to a third party admissible, but also the details of it, including the name of

the man, etc. In fact, where there is no one who can speak to such a complaint having been made immediately after the alleged offence had been committed, a presumption at once arises against the woman. The fact of this complaint, and the hearsay evidence as regards it, is one of the best points in corroboration of the woman's statement. If, therefore, the prisoner were debarred from producing evidence of such previous intimacy as would be favourable to him, he would, in a great measure, be prevented from establishing his defence. In all such charges, an important point for consideration must be the previous relations of the parties concerned.

Man cannot be convicted of rape on his own wife.

352. A man cannot be convicted of a rape on his own wife if she is over ten years of age, although he may be convicted of an abetment of the offence by others, as in the case of Lord Audley (ARCHBOLD, 235). A man may, however, be convicted of an unnatural offence upon his wife, an example of which occurred in Mr. Gribble's experience, *vide* Illustrative Case No. LXXIV.

Statements regarding age unreliable.

353. It may be remarked that in this country, generally speaking, very little reliance can be placed upon a witness' statement of age. In almost every case that comes before a magistrate or a judge there is a witness who cannot tell his age and the court has to guess it. An old woman who could not have been under sixty years of age declared that she was only ten. We do not, however, remember that the converse has ever been sworn to. Whatever error is made is generally in favour of youth.

What constitutes rape.

354. Penetration constitutes the crime of rape in this country, but it is not stated *what* has to be penetrated. In the case of very young children, the most experienced authorities seem to agree that, although there may be a laceration of the hymen, it is extremely rare that there is perfect penetration or destruction of it. In this country, cases have occurred in which the medical evidence was to the effect that, from the tender age of the child, penetration could not have been effected. Injury is admitted, but

rupture or penetration of the hymen is found not to have taken place. We take it that the word "penetration" need not necessarily be held to refer to the hymen, but that directly any portion of the male organ has penetrated between the *labia* the crime is complete to all intents and purposes, and it seems absurd that a medical theory regarding the impossibility of the hymen being penetrated in girls of tender age should stand in the way of a conviction. The word "penetration" will refer equally to the labia as to the hymen or vagina. In England, the term "penetration" has the following meaning: "The introduction of the male organ within the *vulva* constitutes 'penetration.'" We are not aware of any ruling in this country as to what constitutes penetration.

Medical examination necessary as soon as complaint of rape is made.

355. To the police and subordinate magistracy we would say that immediately a complaint of this kind is made, send the woman for medical examination. Every day of delay makes the proof of a true charge more difficult and of a false charge more easy. When a person is accused of an offence of this kind, ask him what he has to say in his defence. If he admits the connection, but denies the rape, endeavour at once to collect evidence of the status and previous relations of the parties. If this is not done *at once,* there is every opportunity given for the concoction of false evidence.

Post-mortem after death from rape.

356. Given marks on the genitals indicative of rape, the medical jurist must consider the following questions:—

(1) Whether the injuries found after death on the body and genitals are such as would indicate the commission of the crime during life?

Note.—*Reg.* v. *Holmes,* 1 L. R. C. C. R., page 334, would seem to draw a distinction between the evidence of a third party as to previous connection with a woman bringing a charge of rape, and general evidence of bad character, or evidence that the accused had previous connection with her. It would, therefore, seem to be safe to say, that if the prosecutrix denies having had connection with a third person, no evidence can be produced to contradict her of the particular act; but if she denies previous intercourse with the prisoner, he can produce evidence because it would be material to his defence, or if she denies being a common prostitute, evidence of the fact is admissible as being relevant to her general character.

(2) Were the injuries sufficient to cause death ?

(3) May the injuries found on the body have been inflicted after death, in order to divert suspicion from the real cause of death ?

(4) Are there any signs of violence on the body which might have proved fatal, other than those that may be ascribed to rape ?

Special point for examination in cases of rape.

357. It will be important to examine the mouth, to see if, for the purpose of preventing the cries of the victim, foreign bodies had been forced into it during life; and also to examine the vaginal mucus and the hair about the genitals for spermatozoa.

Traces left of means employed to commit rape.

358. "During life, traces left by the means employed may be found on the person of the female—*e.g.*, bruises on the abdomen, marks of injury on the genitals, or foreign bodies in the vagina. If miscarriage has actually been caused, the signs of recent delivery may be present. These obviously may be expected to be less marked, the earlier the period of gestation at which the miscarriage has taken place, and the longer the interval which has elapsed since it occurred. Harvey mentions a case where, seven days after the event, no signs of an alleged abortion at three months were present. On the other hand, he mentions a case where relaxation of the genitals was found six or seven days after abortion at 2 and 2¼ months; and another where, in a woman aged 22 years, eight days after abortion at four months the following signs were found:—Vagina slightly dilated, puerperal smell distinct, the uterus could be felt through the abdominal wall, and a little milk could be squeezed from the breasts. In other cases, Harvey states that signs sufficient to indicate abortion were reported to be present a fortnight to a month after the occurrence."*

* LYON'S *Medical Jurisprudence for India.*

ILLUSTRATIVE CASES.

CASE No. LXXI.—ALLEGED RAPE OF A WOMAN AGED FORTY-SEVEN.

THE following important example of a false charge is given *in extenso* from CASPER'S *For. Med.*, Vol. 3, page 314:—

"This was a most important case of accusation of breach of official duty against an official of the ——— court, and it was required to determine the truth of an alleged rape, attended by gonorrhœal infection, after five physicians—two of whom were forensic*—had been already employed in the matter. According to the statement on oath of the prosecutrix, Mrs. R., the accused,—who, we may mention by the way, had the most favourable testimonials of character as an official, a husband, and a father—when he had to carry out an execution against Mrs. R. ten months ago, on the 3rd of July, gave her to understand that he would refrain from action provided she yielded herself to his wishes. Whilst thus conversing, sitting on a ditch beside her, he suddenly fell upon her, flung himself on the top of her, uncovered his penis, and so completely consummated carnal intercourse that the prosecutrix 'felt a strong ejaculation† of semen from him.'" "The whole of this description of the procedure," I said in my report, "is entirely devoid of internal credibility. Mrs. R. is forty-seven years of age, healthy, and apparently quite strong, married, and the mother of several children, and consequently not to be regarded as wholly unknowing in these matters; and though she has not even once sought to explain away the improbability of her statement, by the allegations of temporary illness or unconsciousness, yet it is all the less probable that the proceeding described actually took place; that the accused, E., is a man already forty-two years of age, and not of colossal size or strength, but only of a middling size, and happily married for many years, so that the sexual ardour of early youth cannot be any longer supposed to exist in him. Nevertheless, the prosecutrix declares that by this intercourse she has been infected with gonorrhœa. For this she has applied to Drs. G., N., and I., one after the other, whose certificates and *recipes* are included in the documentary evidence. Of the latter I only remark that they have all been actually prepared, as we learn from the apothecaries' price stamp affixed to each, and that remedies are prescribed in them such as are usually prescribed for urethral mucous discharge (gonorrhœa). Whether Mrs. R. has used all these medicaments, of course, I cannot give any opinion. In regard to the statements of the physicians, that of Dr. G. is of no value, as he never examined Mrs. R., because at the consultation she made 'not the best

* Physicians who were experts as regards their knowledge of those topics relating to medicine which are connected with judicial inquiries.

† Or emission.

impression' on him, and he only prescribed in accordance with her own statement of her complaint. There is no certificate from Dr. I. Finally, Dr. N., on examining the genitals of Mrs. R. on the 3rd of August, that is, only four weeks after the alleged infection, when the last traces of gonorrhœa have seldom if ever quite disappeared, found 'no symptom of gonorrhœa, but only a clear mucous discharge, which, however, only came from the vagina and not from the urethra,'* and the physician last-named convinced himself of this by making pressure along the course of the urethra. This experiment is convincing enough, that on the 3rd of August Mrs. R. had no gonorrhœa (mucous discharge from the urethra) and I may consequently affirm that the supposition of Dr. G., that she had no gonorrhœa at all, was correct. The slight mucous discharge from the vagina does not require to be considered here, since an affection of this character is a very common occurrence in women, and no conclusion can be drawn from it as to the pre-occurrence of intercourse, especially of impure intercourse.

" Having thus shown that it cannot be asserted that Mrs. R. was violated and infected with gonorrhœa by the accused on the 3rd of July, my duty in regard to this case might seem to be discharged. But the certificates of district physician, Dr. L., dated the 18th of September and the 5th of November, and of the forensic surgeon, K., dated the 23rd of September, are apparently opposed to the conclusions just drawn. Dr. L. was officially required to examine Mrs. R. on the 18th of September, that is, ten weeks after the alleged rape, and he found 'traces of what is alleged to have formerly been a violent leucorrhœa, which he calls trifling.' Nevertheless, the forensic physician named does not hesitate to assume 'with certainty, from the mode of commencement and the course of the gradually lessening disease, that it must have arisen from impure connection with a man affected with gonorrhœa.' Dr. L., therefore,—in the first place, from the results of an observation, which is anything but correct, like that of Dr. G., because, as already remarked, 'leucorrhœa' (mucous discharge from the vagina) and true urethral gonorrhœa are two perfectly different diseases; and in the second place, from mere subjective assertions of the prosecutrix, which it is evident can possess no scientific value whatever,—deduces his conclusion 'with certainty,' which is a conclusion, in the certainty of which I am very far from sharing; but Dr. L. and Surgeon K. also declare that they found in the accused the traces of an actual gonorrhœa. L. examined him first on the 5th of November, that is, just four months after the alleged intercourse, and on his shirt 'a few small yellowish stains were visible, which were the results of a discharge from the urethra, which seemed to be the sequelæ† of a gonorrhœa.' Surgeon K. certified, eleven weeks after the alleged crime, on the 23rd of September, that he found the aperture of the urethra of E. not inflamed, and also no purulent dis-

* It should be remembered, however, that the urethra is not always affected in the gonorrhœa of women.

† Consequences or sequels.

charge from it, but that on his shirt there were about twelve 'yellowish-green purulent stains, some the size of a lentil, others of a pea, and a few of them quite recent,' and from this, in curious connection with the 'suspicious behaviour' of the party examined, he draws the conclusion that E. laboured under a virulent gonorrhœa on the 3rd of July and was capable of communicating the infection. But small yellowish-green stains, and few in number, on the linen of both sexes, may readily deceive. I have already spoken of a leucorrhœal discharge from the vagina in woman. But the urethra is also clothed with a mucous membrane, which, like every other mucous membrane—that of the nose, for example—sometimes secretes, even in men, an unusual quantity of mucous which escapes upon the linen. This may be caused by catarrh of the bladder or urethra, hæmorrhoids (or piles), gout, the irritation of worms, &c., and physicians very frequently find considerable discharges of this nature where any suspicion of any infection by impure intercourse is wholly out of the question. To conclude, from the appearance of a few stains such as those described, that there has been impure intercourse, is all the less justifiable where no inflammation is to be found in or about the urethra, which surgeon K. expressly denies. Moreover, at the precognition, on the 10th of February, he deposed what he has to-day again declared to me, that he suffers from occasional incontinence of urine, and especially when much disturbed mentally he cannot well retain his urine, and there is then 'a slight escape from the urethra.' I know not whether this was his condition at the time of the examination; it is, however, certain that the stains referred to must have had a different source from that supposed by both of these experts. Finally, I have still to state, that the day-before-yesterday I examined Mrs. R. and to-day both of the E.'s, to ascertain the condition of their genitals, and I have found them all three sexually perfectly healthy and not affected with the slightest trace of gonorrhœa, and that the wife of the accused asserted to me, as she had formerly done when precognosced, that notwithstanding continuous intercourse with her husband, she had always been perfectly healthy. In accordance with what has just been stated, I give it as my opinion in regard to the queries put to me—(1) that it is not to be assumed that E. could have committed a rape upon Mrs. R. on the 3rd of July in the manner stated; (2) that there is no proof that Mrs. R. suffered from gonorrhœa subsequently to the 3rd of July, and that, according to the documentary evidence, the contrary is more probable; (3) that E., and (4) also his wife, are not at present affected with the said disease and no traces of its former existence are to be found; (5) that the conclusions drawn by the physicians, L. and K., from the stains upon the shirt, are not correct, and that these stains may have arisen from a different cause."

Case No. LXXII.—Infantile leucorrhœa adduced in support of a false charge of rape.

The following case is quoted from Wilde by Taylor:—A charge was raised against a respectable man, that he had had intercourse with, and produced disease in, two children. The day and hour were circumstantially

given—extorted, as it appears, from the children by the parent—and the man was put upon his trial. The appearances were such as are usual in these cases—a purulent discharge from the vagina with some excoriation, but no bruise, laceration, or mark of violence on the pudendum. There had not been any penetration of the vagina. The charges against the prisoner, although unsupported by any affirmative circumstances, received some strength from the admission made by one medical witness for the prosecution, namely, that the appearances *might* have been the result of violence and that the discharge *might* have been produced by friction with the member of a healthy man. It was proved that the prisoner was not affected either with gonorrhœa or syphilis. Geohegan, Churchill, and other medical witnesses of repute, gave testimony to the effect that the child was labouring under an ordinary form of disease, and that there was no medical indication that she had been subjected to any kind of violence. This evidence was considered insufficient, since it was still held by the court that the marks *might* have been caused by violence. The man would probably have been convicted on the child's statement, but was able to prove a complete *alibi.*

Case No. LXXIII.—Doubtful conviction on similar evidence.

The following case, also quoted by Taylor, was tried at St. Louis. A man was charged with attempt to violate a child, *œtat* nine. The evidence against the prisoner was chiefly based on an extorted admission from the prosecutrix, and on the discovery on her clothes of certain stains supposed to have been produced by seminal fluid. The mother examined the genitals and found them inflamed and discharging matter, although several weeks had elapsed since the alleged attempt. A medical practitioner was called to the girl : he found the nymphæ * and orifice in a state of inflammation, which might have arisen from some morbid cause, but he was unable to give any positive opinion regarding the nature of the discharge. About eight days after this, the girl was examined by Stephens, when the parts were still much inflamed and discharging muco-purulent matter. The hymen was uninjured. The defence of the prisoner was, that he was not guilty, and that he was not labouring under gonorrhœa at the time of the alleged complaint. He was convicted. Taylor says : "It is not improbable that this was a case of vaginal inflammation being mistaken for gonorrhœa ; for, as it has been already stated, there are no certain means of distinguishing the two kinds of discharges. The jury, however, decided by moral circumstances, and not by medical evidence."

Case No. LXXIV.—Unnatural offence by a husband on his wife.

In 1870, a Mussulman was charged before Mr. Gribble, as head assistant magistrate of North Arcot, with having unnaturally abused his wife. He had kept her confined in his house for some time after the marriage, and continually repeated the offence, under circumstances of great brutality. To

* The *nymphæ* are two folds of skin of the female external genital organs.

prevent her resistance, he tied her down to a cot, etc. The girl (she could not have been more than twelve or thirteen) managed to send a letter to her brother, who was a sepoy. He came and took her away in her husband's absence. The evidence of the medical witness, Dr. Silas Scudder, was decisive that the offence had been committed. The man was committed to the sessions and sentenced to a long term of imprisonment.

Case No. LXXIVa.—Penetration.

For the details of the following peculiar case we are indebted to Surgeon-Major Cullen, of Khandwa :—A man of about 30 years of age, married, and father of a family, in a drunken fit, stated that he had had connection with various women, wives of men in the station, and especially with an unmarried girl of 18, with whom he said he had had connection several times, and for this statement he was charged with defamation. The girl's mother brought her to Dr. Cullen for examination and he found that she was not only *virgo in tacta*, but had, what is very unusual, a bridle hymen, and neither passage (*i.e.*, bridle and lower hymen, or between bridle and urethra) would admit a finger. The Doctor certified that she had not had connection with any one ; but at the trial the man produced evidence to show that the girl was constantly at his house, in and out of his wife's and his bedroom, and, in fact, that he had had opportunities enough. Familiarity was also proved and he got off. Granted, that the circumstantial evidence corroborated the man's statement, what was it that constituted connection or penetration? The man was young and strong, father of a family, thus proving his virility; the girl was fully developed and the connection was supposed to have been with consent, and not once but often. There was nothing abnormal observable about the hymen, which apparently consisted of a fold mucous membrane. The man's statement, made when drunk but repeated when sober, showed his character and want of principle. In the face of the medical evidence, it would seem that he should not have been acquitted on the charge of defamation.

Case No. LXXV.—Midwives' opinion as against medical opinion in cases of rape.

Amongst the numerous cases quoted by Chevers, the following may be reproduced :—One Kewal was tried at Delhi, on the accusation of a girl of ten, for an attempt to commit a rape. Two midwives, who examined the person of the child, deposed that an attempt to commit a rape on the child had evidently been made, but that the act had not been consummated. In this case the joint-magistrate did not examine the civil surgeon, and, on being called upon by the sessions judge for an explanation, said that he considered the opinion of experienced women more reliable than that of the native doctor, and also preferable on account of feelings of modesty. The explanation was accepted, but Chevers very rightly objects to the magistrate's "most questionable opinon that, in cases of rape, examination by midwives is always preferable to that by persons of the other sex."

CASE No. LXXVI.—CASE OF INTERCOURSE WITH A CHILD OF SEVEN YEARS.

A LAD of Benares, who stated himself to be eighteen, but who appeared to be fourteen or fifteen years old, confessed at the *thannah* and magistrate's court that he had carnal knowledge of a child of seven, had caused her death in so doing, and had stolen her ornaments. The body was found concealed in a room, much decomposed, with a stone on the chest, and a cloth wrapped round the neck. Dr. Leckie, on removing the cloth, found that the whole of the soft parts of the neck had been destroyed, from which he inferred that it had been compressed, and that strangulation was the probable cause of death.—(*Niz. Ad. Reports, N. W. P., June,* 1853.)

CASE No. LXXVII.—MECHANICAL MEANS USED TO DESTROY THE HYMEN.

DR. S. C. MACKENZIE informed Dr. Chevers that he was told by his servant that the bawds, who train up girls to prostitution, insert a piece of sola (the soft spongy stem of *Æschynomene paludosa*), which supplies the place of corks in native pharmacy, as large as the vagina will contain, and then make the unfortunate sit in water. A dilating action, similar to that of a sponge-tent, is the consequence. They gradually increase the size of the plug. Another case is also quoted in which a stone was inserted for the same purpose.

CASE No. LXXVIII.—CURIOUS INSTANCES OF RAPE.

NUMEROUS cases have occurred in which the man has attempted to rape a girl, and, on meeting with any opposition, has killed her. Numerous cases have also occurred, in which the pudendum has been penetrated by a stick, causing severe laceration, hæmorrhage, and death. It is, as Chevers remarks, doubtful whether an act of this kind would constitute penetration according to the definition of rape; but there can be no doubt that it would come under the head of causing grievous hurt with a dangerous weapon, or, if death resulted, murder.

CASE No. LXXIX.—OFFERING GIRLS FOR PROSTITUTION.

A PROCURESS brought a girl into the Officers' Barracks, Fort William, Calcutta, but the person to whom she was presented objected to the girl on account of her youth. The bawd having been disappointed of her fee, in revenge, injured the child, so as to cause very considerable hæmorrhage from the genital organs. The girl was seen by an assistant surgeon in the Fort, and the circumstances of the case having been reported to the police, it was discovered to be a conspiracy against the officer to obtain money. The old wretch was severely punished, and the child soon recovered.—(*Medical Times and Gazette, May* 21, 1859.)

CHAPTER II.

INFANTICIDE AND FŒTICIDE.

Infanticide common in all countries—Two forms of infanticide exist—Infanticide—Essential point to be proved in infanticide—Children born before seventh month rarely live—Uterine existence divided into two parts—Evidence regarding pregnancy—Evidence usually produced to prove pregnancy—Law regarding proof of infanticide—Case of infanticide at Cuddapah—Natural and criminal abortions—Hydrostatic test as to whether child born alive—Guy's objections to hydrostatic test—Evidence of those who witnessed birth of child sufficient—Suspended animation—Marks of violence no proof of murder—Lung test in case of strangulation of infant—Important changes after infant has breathed—Changes before and after respiration—Death of fœtus due to either precipitate labor or criminal violence—Determination of cause of death of fœtus—Causes of death of fœtus—Rupture of umbilical cord—Fracture of skull of newly born infants—Summary of facts regarding live birth—Whether fœtus born dead or alive—Taylor's Summary of infanticide—Taylor's Summary regarding injuries to infants—*Resumé* regarding infanticide—Medical evidence—Decrease of infanticide in recent years—Special points for consideration regarding infanticide.

Infanticide common in all countries.

INFANTICIDE is common in almost all countries, the motive being generally to get rid of an illegitimate child or less commonly, to get rid of a child which the parents are too poor to support.

Two forms of infanticide exist.

359. Two forms of infanticide are usually described, *viz.*, infanticide by omission and infanticide by commission. Homicide is destroying the life of a human being. Popularly, the term "infanticide" is used to denote homicide where the human being killed is a newly-born infant. The law, however, draws no such distinction. In law, infanticide is homicide, and the provisions of the law which apply to homicide apply equally to infanticide. But although the law draws no distinction between infanticide and homicide, the subject of infanticide requires special consideration on account of—(1) the frequency with which cases occur, and (2) the special nature of the medico-legal questions which arise. In India, two forms of infanticide are said to exist, *viz.*, (1) infanticide irrespective of the sex of the child, and (2), infanticide of female children. As regards the first of these forms of infanticide, the motives leading to it in India are similar to those which lead to it in other countries. Its frequency in India

is, however, specially affected by certain social customs, *viz.*, (*a*) early marriage, which tends to diminish the frequency of the crime, and (*b*) prohibition—especially among higher caste Hindoos—of widow re-marriage, which tends to increase its frequency. As a consequence, therefore, while in European countries the accused is most frequently an unmarried female, in India the accused is very frequently a Hindoo widow. The second form of infanticide may be said to be special to the East. In India the motives leading to female infanticide are—(*a*) family pride among certain divisions of the warrior (Kshatri) caste, notably the Rajpoots and Thakoors, and consequent fear that a husband of suitable rank and position may not be found for the girl; (*b*) the extravagant expenditure entailed by custom on the parent at the marriage of a daughter; and (*c*) the disgrace which, by social custom, is attached to the father of a girl who attains puberty unmarried. Notwithstanding the fact that in India, owing to the exertions of the British Government, this second form of infanticide had been rendered much less prevalent, it was considered necessary in 1870 to pass a special Act for its repression, and even now the crime is far from rare. Some idea of the extent to which it was practised may be formed from the facts which came out in the course of an inquiry ordered by Government previous to the passing of the Act. It was found, for example, that in many villages of the Benares district there were no girls at all. In Mynpoory, again, out of thirty villages, in eleven there were no girls, and in the whole thirty only 37 girls to 329 boys. Again, in the North-Western Provinces, in seven villages inhabited by Rajpoots, there were 104 boys to one girl, and in nine other villages 71 boys to seven girls. In Kathiawar and Kutch also the practice largely prevailed. In the latter province, in 1840, there were only 335 females to 4,912 males of pure Jadeja (Rajpoot) blood. Further, it was shewn that where measures for the repression of the crime had been adopted, the result was to greatly increase the number of female children. In Mynpoory, for example, the number of Rajpoot girls rose in thirteen years from *nil*

to 250, and in the Agra district the number of girls was doubled in a few years.*

Infanticide.

360. Infanticide† unfortunately is a crime which is still very common in India. As previously implied, it is of two kinds—*female infanticide,* as practised among some of the still almost savage hill tribes, and *infanticide of illegitimate children.* The former offence is gradually being stamped out, though there are occasionally instances of it brought to light; but the latter offence still prevails to a very large extent, and will probably continue as long as there exists a prohibition against the re-marriage of widows. This kind of crime is generally committed by the mother immediately after the birth, and the body of the child is then concealed and secretly disposed of, the punishment for which is provided for under section 318 of the Penal Code, which runs as follows:—"Whoever, by secretly burying, or otherwise disposing of, the dead body of a child, whether such child die before or after birth, or during its birth, intentionally conceals, or endeavours to conceal, the birth of such child, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both."

Essential point to be proved in infanticide.

361. An essential point to be proved is—Was the body found that of a child fully developed? In order that the mother should be punishable at all, it must be proved that the child had arrived at such maturity that it might have been born alive (4 M. H. C. Rul., 63).

Children born before seventh month rarely live.

362. Although there are cases on record of women who have been delivered of living children in the fifth, sixth, and seventh months, it is acknowledged by all the authorities that it is rare that children born before the seventh month are born alive.

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* Lyon's *Medical Jurisprudence for India,* 2nd ed., pp. 351-352.

† *Infanticide* is the murder of an infant. The word used as a noun, or referred to a person, means a criminal who kills, murders, or destroys an infant.

363. Taylor divides the uterine existence into two parts—up to the end of the sixth month it is a *fœtus*, and from the sixth to the ninth month it embraces a period "which may be considered to comprise some cases of abortion and all cases of child murder."

Uterine existence divided into two parts.

364. In this country, it is generally impossible to obtain evidence regarding the exact time of a woman's pregnancy, and it is only from an examination of the body that it can be decided whether it is that of a fœtus or a viable child. If the former, the woman might be convicted of having caused an abortion,* but it is only when the latter is proved that she could be convicted of infanticide or of concealment of birth. The statements made by the woman as to her condition are, for medico-legal purposes, untrustworthy. She may or may not willingly deceive, but she may misinterpret her condition: she may misinterpret symptoms of ascites for those of pregnancy.

Evidence regarding pregnancy.

365. The evidence generally produced to prove a woman's pregnancy is that of neighbours who have observed her figure, or that of a washerman who says that for many months she has not menstruated, judging from the clothes sent to him to be washed. It would be clearly impossible, from evidence of this kind, to fix a date at which the pregnancy commenced.

Evidence usually produced to prove pregnancy.

366. Under the English law, if pregnancy can be proved, it is not absolutely necessary for a conviction for concealment of birth that the body should be found, provided there is satisfactory proof of the death; but it is probable that few judges in this country would be willing to convict unless there was satisfactory evidence of the age of the child; for a woman could not be convicted of concealment of the birth of an inviable fœtus, and as it is quite possible for

Law regarding proof of infanticide.

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* Legally a "miscarriage" comprehends both abortion and premature labour, but medical men employ the term "premature labour" to those cases in which the child has been expelled from the womb after having attained a viable age—"abortion" or miscarriage being used to signify the expulsion of a fœtus at any earlier period.

a woman to abort, or to miscarry, without having had resort to criminal measures, the mere finding of a fœtus would be no proof of criminal abortion. This remark may, at first sight, seem superfluous, but the following case, which was tried by Mr. Gribble at Cuddapah, will show that it is not so.

Case of infanticide at Cuddapah.

367. A woman was arrainged on a charge of infanticide and also of having caused abortion. The evidence against her was that of the washerman to prove her pregnancy, a cloth stained with blood, and the finding of a decomposed body in a well. This body was said to be fully developed, but the village authorities spoke of it as being a six months' development. The woman was examined by an apothecary three days after the alleged offence. There was then no lochial discharge, and nothing beyond a slight irritation of the parts. The mouth of the womb allowed the admission of two fingers. The apothecary, however, swore that he believed the woman to have caused abortion by mechanical means, but could give no reason for this opinion, except the slight irritation of the parts *and that the people who brought her had told him so.* The woman did not deny having been pregnant, but said she had miscarried, and had thrown the fœtus into the well. She was acquitted. The charge of infanticide fell through, because there was nothing to show the cause of death, or that what was found was really a 'viable' child, and it was held that the slight marks of irritation were quite as likely to be caused by the natural abortion (miscarriage) of a fœtus so large as to be described to be of a six months' development, as by mechanical means calculated to produce abortion.

Natural and criminal abortions.

368. It must be remembered that natural abortions are very common, and, according to Mr. Whitehead's observation of two thousand pregnancies, one in seven terminated in abortion. In this country it is, no doubt, true that there are a very large number of criminal or violent abortions, and that an unfortunate widow who has yielded to temp-

tation has every reason, through fear of exposure, loss of caste, etc., to resort to such means in order to save her reputation. At the same time, it must be remembered that everything and everybody are against her. There are probably suspicions of her immorality; and in a small village community, where nearly everything that goes on is known, people are on the look-out, and even if she should miscarry naturally, she is sure to be suspected of having used criminal means to produce abortion. It is, therefore, necessary that there should be some direct evidence of the means used to commit abortion, since the unmarried woman is probably more liable to suffer from natural abortion than the married one. The former will endeavour to conceal her condition, and will often undertake work which the married woman, having nothing to conceal, would not undertake.

369. In a charge of infanticide, the first point to be settled is, whether the body is that of a child that was born alive. Generally speaking, the only test which is applied by mofussil practitioners in charge of hospitals is the *hydrostatic test, i.e.*, by putting the lungs into water. If they float, it is held that the child must have breathed, and must therefore have been born alive. It is, however, doubtful, whether this test is always as carefully made as it should be. Taylor recommends that, first of all, the lungs should be placed in the water entire, with the heart attached. If the lungs are able to float, together with the heart attached, there can scarcely be any doubt that the child was born alive. The lungs should then be cut into six or eight pieces, and it should be noted whether they contain bloody froth and crepitate under the knife, which is a test of respiration having taken place. These pieces should be placed in water in order to see whether they float. If they do, they should then again be taken out, enclosed in a cloth, and placed on the ground, and should be covered with a board, on which the medical man should stand so as to give an even pressure throughout. They should then again be

Hydrostatic test as to whether child born alive.

placed in water, and if they still float, and if the lungs are fresh, *i.e.*, unaffected by decomposition, the medical man may safely give it as his opinion that the child had breathed and had been born alive. This point of decomposition, however, is one about which the medical witness should be carefully cross-examined, because if decomposition has set in at the time of the test being applied, the lungs will probably generate gases, etc., which will make them float. Now, this is a question which is very seldom asked, and as, generally speaking, such examinations in this country are made twenty-four or thirty hours after a body has been found where it probably had been hidden for some time, it is exceedingly likely that decomposition may have set in by the time the examination is made. If that is the case, no reliance can be placed upon the hydrostatic test, even after the application of pressure.

Guy's objections to hydrostatic test.

370. The following are Guy's objections to the hydrostatic test :—

(1) The lungs may sink, and yet the child may have breathed, for the respiration may have been too imperfect to render any part of them buoyant.

(2) The lungs may sink, though respiration has taken place, in consequence of disease.

(3) The lungs may float, and yet the child may not have breathed in consequence of artificial inflation. (An important case on this subject was reported in the "*Lancet*," July 18, 1885, page 127.)

Evidence of those who witness birth of child sufficient.

371. Of course, where there are witnesses who can speak to the fact of the child having been born alive, by being able to state, for instance, that it cried, etc., such evidence would probably be sufficient without any medical evidence. It is, however, always advisable that the body should be sent to the hospital for examination,

because there are many instances of children having been born dead who cried before delivery, and a medical examination might show clearly that the child must have been born dead.

372. It must, however, also be remembered, that the fact of the lungs containing no air is not a conclusive proof that the child was born dead, and, in the same way, the fact that they do contain air is not a conclusive proof that the child was born alive. Taylor remarks: "The restoration of many children, apparently born dead, is a clear proof that many are born living who might be pronounced dead, simply because breathing and life have been considered synonymous terms." It is a common practice with midwives, when, after the cord has been separated, the child lies motionless, to slap it gently on the back so as to induce respiration. This is often continued for some time, and if not at once successful, water is sprinkled in the child's face so as to make it gasp. The child then breathes, but it is clear that it must have been living previous to its first respiration; but that, after its existence became a separate and independent one, animation was for a time suspended. "In fact," as Taylor says, "it would appear that breathing is regarded as only *one* proof of life, and the law will therefore receive any other kind of evidence which may satisfactorily show that a child has lived, and make up for the proof commonly derived from the state of the lungs."

Suspended animation.

373. The next question of importance to be decided is—What was the cause of death? Marks of violence on the body are not necessarily proof that a child has been killed. "In general," says Taylor, "when children are murdered, the amount of violence used is considerably greater than that which is required to destroy them, whereby satisfactory proofs of the crime are occasionally obtained. On the other hand, the body of a still-born* child, dead from

Marks of violence no proof of murder.

* Or born lifeless.

natural causes, is often covered with lividities and ecchymoses; the fœtal blood does not coagulate with the same firmness as in the adult; hence the evidence derivable from the extent, situation, and characters of marks of violence is generally of too vague and uncertain a kind to allow of the expression of a medical opinion that the child was living when the violence was offered to it. The characters which have already been described as peculiar to wounds, contusions, and fractures inflicted during life, may be met with in a child, whether it has breathed or died without breathing." It is possible also that the injuries found may have been caused in the act of birth. For instance, children are often born with the cord twisted round the neck, and it also sometimes happens that newly-born children are killed by the cord being twisted round the neck after birth. If the medical examination has been carefully conducted, there should be no difficulty in distinguishing between a natural and an artificial twisting. If the lungs show signs of respiration having taken place, there can be little doubt that the cord was twisted *after* the child breathed. For an important case of this kind, see Illustrative Case No. LXXX. At the same time, Williamson, quoted by Taylor, has drawn attention to an important fact. Referring to *Price's* case, in which the cord was tightly twisted round the neck, he states that, in similar cases which have occurred in his own practice, the child has breathed immediately on the birth of the head, but, owing to the shortness of the cord, the child would have been strangled unless he had divided it. Thus, a child might die apparently strangled, and not be born alive, although it might have so breathed during birth that the lungs would present all the characters of respiration.

Lung test in case of strangulation of infant.

374. The lung test is unnecessary when—

(*a*) The umbilical cord has dropped off and cicatrisation has followed.

(*b*) Where food is found in the stomach.

(*c*) Where there are evident signs of putrefaction *in utero*.

(*d*) Also, in the case of the birth of monsters, or where, from congenital malformation, the possibility of live birth is excluded.

375. After a new-born infant has breathed properly, certain important changes occur in the lungs. Of these the chief are—(1) an alteration in the appearance and feel of the lung tissue; (2) an increase in weight; and (3) a reduction in their specific gravity.

Important changes after infant has breathed.

376. The following comparative details* show the changes produced before and after respiration :—

Changes before and after respiration.

Before respiration.	*After respiration.*
Dark red in colour, collapsed, occupy only upper part of chest, leaving the pericardium exposed.	Bright red or pink, expanded and nearly cover the pericardium.
Do not crepitate when handled or cut, and exude little blood on section. No inflated air vesicles visible, but possibly bubbles of gas, due to putrefaction, present on surface of the lung. These bubbles are,—	Crepitate when handled or cut, and exude frothy blood freely on section. Inflated air vesicles visible on surface of lung. These are,—
(1) Large and not uniform in size;	(1) Small and uniform in size;
(2) Not arranged in groups;	(2) Arranged in groups;
(3) Project considerably from the surface of the lung; and	(3) Project only slightly or not at all from the lung; and
(4) The gas in them can be pushed readily from place to place.	(4) Cannot be pushed from place to place.

377. As regards the mark on the neck, Taylor says that if it is deep, broad, much ecchymosed, and there is extravasation of blood beneath, with injury to the muscles or windpipe and ruffling or laceration of the skin, it is impossible to ascribe these appearances to accidental pressure by the navel string.

Death of fœtus due to either precipitate labour or criminal violence.

378. With regard to determining whether the death of the fœtus arose from (1) precipitate labour, or (2) criminal violence, the following points deserve attention :—

Determination of cause of death of fœtus.

I.—In favour of precipitate labour :—

(*a*) Rupture of the umbilical cord. (For details see paragraph 380).

* From Lyon's *Medical Jurisprudence for India*, 2nd Ed., p. 355.

35

(*b*) Placenta not detached from the child.

(*c*) Fracture of the parietal bones (see foot-note on page 283), the fracture radiating into the frontal* and squamous portion of the temporal† bone. In experiments on twenty-five children dropped from a height of thirty inches, one parietal bone was found fractured in sixteen of the cases, both parietals in six cases. The fractures in most cases occurred about the parietal protuberances. It must be remembered that the children were dead, and that it is easier to fracture the skull of a live infant than that of a dead one.

(*d*) Imperfect ossification‡ of the bones of the skull.

(*e*) Absence of other injuries.

II.—In favour of criminal violence :—

(*a*) The fact of the umbilical cord being divided by some sharp instrument and not torn.

(*b*) Extensive fracture of one or more of the bones of the cranium.

(*c*) Fracture and dislocation of the neck.

(*d*) Presence of incised wounds and other evidence of violence.

Causes of death of fœtus.

379. In connection with the foregoing, it is necessary to state that the death of the fœtus may be due to—

(1) Immaturity.

(2) Complications occurring during or immediately after birth.

(3) Congenital disease in one or more of the fœtal organs.

(4) Neglect and exposure.—(HUSBAND).

Rupture of umbilical cord.

380. In all cases of rupture of the umbilical cord, it would be advisable to measure the length of the cord, and then the distance of the vulva from the ground, allowing,

* The *frontal* bone forms the upper and forepart of the skull.

† The *temporal* bones are two in number—one on each side of the head.

‡ *Ossification* is the process by which bone is formed.

of course, for the woman not being quite erect at the time of delivery owing to a separation of the legs. A disproportion between the two measurements may or may not account for the rupture of the cord. The following measurements may be taken:—Usual length of cord eighteen to twenty inches; distance of vulva from the ground twenty-six inches, but allowing for stooping a trifle more than two-thirds of the above. To the length of the cord must be added about nine inches, the distance from the navel to the top of the head of the child. Thus, a fall of about thirty inches will put no strain on the cord. A case is on record of a rupture of the cord taking place while the woman was in a *recumbent* position, but in that case the labour was precipitate and the cord very short and of small diameter.

381. The bodies of newly-born children are frequently found with the skull fractured, and an important question arises whether the fracture occurred from accident or from intention. Cases have occurred in England of sudden delivery whilst the woman was standing, in which the child fell to the ground, the cord was ruptured, and the child was picked up dead. Cases of this kind are much more liable to occur in this country, where Native women are generally delivered standing and are frequently tied by the hands whilst the labour is taking place. In the case of married women, there are, as a rule, attendants at hand, who will probably guard against any accident; but in the case of unmarried women, or of widows who are anxious to conceal the birth, it is clear that a fracture of the skull might easily be caused by accident. The ordinary colloquial expression is, "the child fell out." A rather singular case of this kind occurred at Cuddapah. A woman—a widow—was known to be pregnant, and as her time approached a certain charitable neighbour was on the look-out. One evening the neighbour, who was watching, looked in at the door, and saw the woman standing up with a newly-born child at her feet. An alarm was at once raised, and the child was found dead with a fracture of the skull. The cord was ruptured. The ground on which the child had fallen was hard. The

Fracture of skull of newly-born infants.

woman said that labour had come on suddenly, the child had "fallen out," and had died at once. The prisoner was acquitted, as it was considered right to give her the benefit of the doubt. The officious neighbour, by at once raising an alarm, prevented the possibility of any charge of concealment of birth being established.

Summary of facts regarding live birth.

382. The chief facts bearing on the question of live birth may be summarised as follow:—

Conditions observed from a few minutes to some hours after birth:—

The stomach contains a frothy fluid, and clots will be found in the vessels of the umbilical cord.

Condition observed after twenty-four hours:—

Contraction and thickening of the coats of the umbilical arteries, near the umbilicus.

Conditions observed after the second day:—

Contraction throughout the greater part of the umbilical arteries.

The epidermis begins to exfoliate.

Conditions observed after the third day:—

Contraction of the umbilical arteries to their termination in the iliacs.*

Slight contraction noticeable in the umbilical veins.

Dessication of the cord, the formation of an inflamed ring, and a slight purulent discharge at the point of ultimate separation.

Condition observed after the fourth day:—

The cord separates.

Condition observed after the fifth day:—

Contraction of the umbilical veins complete.

Condition observed after the seventh day:—

The *ductus arteriosus*† contracted to the size of a crow-quill.

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* The *iliacs*, or *common iliac arteries*, are the two large branches of the abdominal aorta.

† The *Ductus arteriosus* is a vessel which connects the right ventricle of the heart with the arch of the aorta.

Conditions observed from the eighth to the tenth day :—

The fœtal openings (*i.e.*, ductus arteriosus, ductus venosus,* and foramen ovale†) become obliterated.

Conditions observed from the tenth to the twelfth day :—

The osseous centre of the femoral epiphysis‡ measures 5 to 6 millimetres in diameter, that is, about 1-5th or 1-4th inch.

Cicatrization of the umbilicus. If the umbilicus be healed, it indicates that the infant has lived for about twenty-one days.

Certain conditions important to record, but of doubtful value in deciding a child's age :—

The presence of food in the stomach.

The depth to which air is observed to have penetrated in the intestines.

The presence (and, if present, the quantity and the situation) of the *meconium*.§

Whether fœtus born dead or alive.

383. In determining as to whether the fœtus was born dead or alive, the following points should be taken into consideration :—

(1) In the case of children born dead, irrespective of whether the death occurred before or during birth, no air is to be found in the stomach or intestines. If, therefore, the stomach and intestines of a still-born child be removed (after they have been carefully tied and secured) and placed in water, they will sink.

(2) The presence of air in the stomach depends on respiration (the air being swallowed during inspiration) and is independent of the taking of

* The *Ductus venosus* is the vein which conveys the blood of the umbilical vein to the liver during intra-uterine life.

† The *Foramen ovale* is an opening between the right and left ventricles of the fœtal heart.

‡ The lower extremity of the thigh bone.

§ The *meconium* is the fæces found in the large intestine of the fœtus and which is discharged after birth.

food, hence the air probably reaches the stomach with the first respiration, and as breathing proceeds, finds its way by degrees into the intestines.

(3) After respiration the stomach and intestines, when placed in water, float.

(4) The more completely the intestines be inflated, and the lower in the bowels that air be found, the longer in all probability the child has lived, and the more certain is the evidence of live birth. (Tidy's *Legal Medicine*, Vol. I, p. 281.)

Taylor's summary of infanticide.

384. Taylor (page 418, Vol. II, 3rd edition) summarises his chapter on infanticide with the following abstract :—

(1) The congestion of the head and face in a new-born child is not a proof of death from strangulation.

(2) That a child may be strangled during birth by the accidental twisting of the navel string round its neck.

(3) That the navel string (or umbilical cord), like any other ligature, may produce a livid or ecchymosed depression on the neck.

(4) The marks on the neck, arising from accidental causes, may resemble those which arise from strangulation.

(5) That the local effect of constriction on the neck, either by the navel string or any other ligature, is the same if the child be *living*, whether it has, or has not, breathed.

(6) That the effect is the same, whether the child has been *partially* or *entirely* born.

(7) That the effect of the ligature on the neck of a living child is the same, whether the navel string has, or has not, been severed.

(8) That a new-born child may die from strangulation, without this fact being necessarily indicated by ecchymosis on the neck. This depends on the

nature of the ligature and the amount of force used.

Taylor's summary regarding injuries to infants.

385. As regards other injuries, Taylor says :—*

(1) That a new-born child may die from violent causes of an accidental nature.

(2) That some forms of violent death are not necessarily attended with external signs indicative of violence.

(3) That a child may be accidentally suffocated during delivery.

(4) That the usual marks of death, from suffocation or drowning, are not apparent except in the bodies of children which have breathed.

(5) That the state of the umbilical cord may often furnish important evidence.

Resumé regarding infanticide.

386. The following further *resumé* of the subject of infanticide may be useful :—

(*a*) Infanticide is not regarded as a specific crime apart from homicide.

(*b*) It is tried by the same rules of evidence as apply to murder.

(*c*) The law presumes that every child is born dead, till proof to the contrary is given.

(*d*) The onus of proving live birth devolves on the prosecution.

(*e*) The body need not be found, in order to obtain conviction of the suspected party, if not of infanticide, at least of concealment of birth.

(*f*) In the absence of proof of infanticide the woman may be tried for *concealment of birth,* that is, disposing secretly of the body, whether the child be born dead or alive.

(*g*) A woman may be tried for *concealment of pregnancy* when the child is dead or missing, if she do not

* *Principles and Practice of Medical Jurisprudence,* Vol. II, p. 406, 3rd Ed.

call for or make use of help or assistance in the birth; but the case is quashed if the child be shown alive by the mother to others.—(HUSBAND.)

Medical evidence.

387. The medical evidence depends on the body being found and examined, and the medical witness may be examined on one or more of the following points:—

(1) The recent delivery of the accused.*

(2) Maturity of the child† found.

(3) Was the child still or live-born? ‡

(4) Cause of death. §

(5) Lastly, as to the mental condition of the mother—puerperal mania,‖ etc.

(6) It should be remembered that some females recently delivered, may have strength to exert themselves and to walk great distances.

(7) That a new-born child may speedily die from exposure to cold or from want of food.

(8) That slight fractures of the bones of the cranium may arise from the action of the uterus on the head of the child during delivery.

(9) That women may be unexpectedly delivered while in an erect posture, the umbilical cord being under these circumstances, ruptured, and the child may, or may not, sustain injury from the fall.

(10) That the violence found on the body of a child may be sometimes due to attempts innocently made by a female to aid her delivery.

Decrease of infanticide in recent years.

388. Although, in certain parts of India, the crime of infanticide has decreased in recent years, according to the report of the Sanitary Commissioner, in the year 1890, the

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* *Vide* Chapter on ABORTION.

† *Ibid.*

‡ *Ibid.*

§ For causes of death of fœtus or new-born child, *vide* next chapter.

‖ For sign of puerperal mania, *vide* chapter in INSANITY.

female death-rate in the Punjab among infants was considerably in excess of the male death-rate, and there seems to be only too good ground to suppose that the excess is caused by deliberate crime in the shape of female infanticide or an equally culpable neglect of female children.*

Special points for consideration regarding infanticide.

389. In drawing up reports in connection with the subject of infanticide, particular attention should be paid to the three following points :—

(1) All measurements, weights, and statements of size, should be given in standard measures and weights. If comparisons be made, such comparisons should be with well-known objects.

(2) Dates, places, and names of persons, where such are known, should be plainly stated.

(3) The conclusions, or the opinions founded on the facts, should be kept distinct from the facts themselves.†

390. It should never be forgotten by the medical practitioner that an examination of the female can only be conducted with her consent, whether the results of that examination are needed in evidence in rape, criminal abortion, infanticide, or for any other purpose. In some cases of criminal abortion and infanticide, on her refusing to allow an examination, it may be necessary to inform her that such refusal will be regarded as suspicious evidence of her guilt.

* *Pioneer*, 10th July, 1891. † TIDY'S *Legal Medicine*, p. 325.

ILLUSTRATIVE CASES.

Case No. LXXX.—Accidental strangulation with the navel string.

The following case is quoted by Taylor:—A lady was in labour with her first child. The labour was of a lingering kind, owing to the size of the head, and the child came into the world dead. The navel string was found coiled three times round the neck, passing under the right arm-pit, and upon removing it three parallel discoloured depressions were distinctly evident. These extended completely round the neck, and corresponded to the course taken by the coils. The child appeared as if it had been strangled. Had this child been born secretly, and the cord removed, this state of the neck might have created a strong suspicion of homicidal violence. Strangulation after birth could not, however, have been alleged, because there would have been no proof of respiration. When a blue mark is found on the neck of a child, whose lungs retain their fœta character, *it is fair to presume,* cæteris paribus, *that it has been accidently occasioned by the twisting of the umbilical cord during delivery.*

Case No. LXXXI.—Accidental strangulation with the navel string.

Dr. Price contributed to the *Medical Gazette* notes of a case in which the cord, which was short, was so tightly twisted round the neck of the child, that he was compelled to divide it before delivery could be accomplished. There was, in this instance, a deep groove formed on the neck, conveying the impression to himself and a medical friend, that, in the absence of any knowledge of the facts, they would have been prepared to say that the child had been wilfully strangled by a rope.—*(Medical Gazette, Vol.* 38, *p.* 40.)

Case No. LXXXII.—Cerebral hyperæmia with precipitate labour.

The following case is from Casper:—The body of a mature new-born boy was found in a night chair. The placenta (or "after-birth") weighed 11 oz., and the child 6½ lbs. It was 18 inches in length, but the diameter of the head and shoulders was small (3 × 4 × 4½ inches of the head, 4¼ for the shoulders). The portion of the funis* attached to the child was, 14 inches long, torn across with ragged edges, but tied. Beneath the pericranium,† on the left parietal bone,‡ were a few isolated ecchymoses but no other trace of violence, internally or externally, was found. The body was perfectly fresh. Death had been caused by cerebral hyperæmia, and not by suffocation. Respiratory life was indubitable. The fact of the placenta being found along with the child, the funis being torn, the small diameter of the head and shoulders, and the secret

* *Funis* is synonymous with umbilical cord or navel string.

† The *pericranium* is the membrane immediately covering the bones of the cranium.

‡ The right and left *parietal bones* form the chief part of the roof of the skull.

delivery, were in favour of the birth being precipitate. The ecchymoses on the parietal bone rendered it probable that the child had fallen on its head. Such a result was not likely to occur if the birth had taken place upon the night chair, and the child had fallen upon a soft semi-fluid mass of excrement. In this case, moreover, death would have been caused by suffocation, and not by cerebral hyperæmia.* Accordingly, it was concluded, that this viable and live-born child had died, soon after birth, from cerebral apoplexy, produced by falling upon some hard floor at its birth, and that after its death it had been flung into the night chair to save the expense of burial, with a view to the subsequent complete concealment of birth.

Case No. LXXXIII.—Death from neglect.

Chevers gives the following description of the manner in which the umbilical cord is divided and dressed by native women in this country. In many parts the cord is not divided until after the placenta, or after-birth, has come away. It is only tied with one ligature, near the child, and, before tying, the blood is either pressed towards the child or towards the placenta, according as the child seems lively or otherwise. The cord is generally divided by a piece of bamboo, and a fact of the cord being found with jagged edges is therefore no proof of neglect. In order to induce the mother to bring forth the after-birth, it is usual to put some hair into her mouth. This causes her to try and vomit, and the effort brings away the placenta. It is also usual to observe certain religious ceremonies before cutting the cord. A case is quoted (Niz. Ad. Report, N. W. P., Feb. 1853) in which a female mendicant, of weak intellect, at Jaunpore, gave birth to a female infant, which she left in some straw where she had slept and went begging. The civil surgeon examined the body, and could find no apparent cause of death. He considered it was probably caused by neglect, as the navel string had not been severed, the after-birth being still attached. The child had breathed, but death probably took place very shortly after its birth.

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* Or congestion of the brain.

CHAPTER III.

ABORTION, LEGITIMACY, AND PREGNANCY.

Abortion—Duties of medical officers in cases of abortion—Examination of the female during life—Examination of the body of the mother, if dead—Examination of substances expelled from the womb—Examination of instruments and drugs in the possession of the accused—Signs of wound irritant poisoning, etc., in cases of abortion—Death during menstrual period—Presumption as to legitimacy—Grounds on which child's legitimacy may be disputed—Medico legal questions when legitimacy disputed—Questions in case of contested legitimacy arise in divorce suits—Case of how long child lived after birth—Examination of woman during life in case of abortion—Symptoms to be observed before ordinary signs of abortion—Signs of abortion in the living—Determination of existence of pregnancy.

Abortion.

ABORTION is a crime of frequent occurrence in India. A very large percentage of cases escape detection, and even such cases as become the subject of medico-legal inquiries, demand much skill and call for careful attention to every detail of the circumstances connected with the commission of the crime, to bring home the charge against the delinquent. We have had some experience in the investigation of cases of this kind, and are impressed with the necessity of adopting the following method of conducting an inquiry in a case of abortion.

Duties of medical officers in cases of abortion.

391. The duties of medical practitioners in cases of *suspected* abortion may be divided as follow :—

I.—The examination of the female during life.

II.—The examination of the body of the mother, if dead.

III.—The examination of substances expelled from the womb.

IV.—The examination of instruments and drugs in the possession of the accused.

I.—EXAMINATION OF THE FEMALE DURING LIFE—

Examination of the female during life.

(1) Temperament.

(2) As to the woman's predisposition to abort, and the period at which abortion had commonly occurred.

(3) General state of health. (Note existence of leucorrhœa,* excessive menstruations, syphilis, asthma, malignant disease,† uterine diseases, etc.).

(4) Whether the woman be well or ill formed. (Note pelvic malformations, effects of tight-lacing).

(5) Whether or not there be signs of recent delivery or of the expulsion of uterine contents.

(6) Whether any cause can be assigned to account for the abortion (*e.g.*, violent coughing, blood-letting, straining at stool, violent exercise, undue excitement, septic poisoning,‡ violence, administration of medicines, etc.).

(7) All injuries of the genital organs. (Consider whether the injuries might be self-inflicted.)

II.—EXAMINATION OF THE BODY OF THE MOTHER, IF DEAD—

Examination of the body of the mother, if dead.

(1) The necessity for care not to mistake the effects of menstruation for those produced by abortion.

(2) To avoid injuring the parts by the knife or otherwise during the *post-mortem* examination.

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* *Leucorrhœa*, popularly known as "the whites," is a discharge of mucus or muco-pus from the vagina, the womb, or the neck of the womb, or from all three parts. It is liable to be mistaken for gonorrhœa.

† *Malignant disease* here refers chiefly to cancer.

‡ *Septic poisoning* is a variety of blood poisoning.

(3) To consider the possibility of injuries being self-inflicted—

(*a*) Note the existence of any marks of violence on the abdomen or other parts.

(*b*) The condition of the genital organs, noting all inflammations, rents, tears, perforations, etc. [If the uterus be injured it should be preserved.]

(4) The condition of the genital passages (relaxed or otherwise).

(5) The condition of the os uteri* (virginal or gaping, etc.) The mouth of the womb in women who have never been pregnant is even and circular.

(6) Vaginal secretions, and if present their character.

(7) The general appearance of the breasts, presence of milk, etc.

Examination of substances expelled from the womb.

III.—EXAMINATION OF SUBSTANCES EXPELLED FROM THE WOMB—

(1) Nature of the supposed product of conception.

(2) Consider whether there is evidence of a diseased condition of the membranes or of the placenta, *e. g.*, structural degeneration.

(3) If a fœtus be found, determine (*a*) whether it was born alive; (*b*) its probable age; and (*c*) the cause of its death.

(4) Determine whether, if there be wounds or other injuries, they were inflicted during life or after death.

Examination of instruments and drugs in the possession of the accused.

IV.—EXAMINATION OF INSTRUMENTS AND DRUGS IN THE POSSESSION OF THE ACCUSED.

(*a*) If abortion occurs naturally at an early period of

* The *os uteri* is the mouth of the womb.

utero-gestation, the signs usually found may be very slight, or even altogether absent.

(*b*) After the third month the insertion of the placenta may be detected by a rough place on the inner uterine wall.

(*c*) In making a *post-mortem*, care is necessary in removing the uterus and laying it open, as, if there be a wound, it may be suggested that it was made during the *post-mortem*. The specimen itself should refute such a charge.

(*d*) Punctures, lacerations, and incisions in the uterus and contiguous organs must be specially looked for. These (particularly the punctures) are often multiple. "He stabbed me three or four times," is a common remark of the victim.

(*e*) Whether there be any signs of irritant poisoning in the stomach, or of inflammation of the bladder, kidneys, rectum, etc. [The contents of the stomach, is necessary, to be preserved.]

(*f*) Whether the viscera (or internal organs of the body) generally indicate loss of blood during life.

Signs of wound irritant poisoning, etc., in cases of abortion.

392. It is usually not difficult to distinguish wounds made before, from those inflicted after death, because the former will have cicatrized or be coated with lymph, pus, or blood. It is not always possible, but generally it is easy, to distinguish the results of violence from natural and spontaneous ruptures of the uterus (see Chapter on that subject in Barnes' "*Obstetric Operations*," 2nd edition, pp. 320—375). Peritonitis, when resulting from violence, is generally more localised than when it is, so to speak, spontaneous, in puerperal cases at full term of pregnancy. Note should specially be taken in all cases of abortion as to

whether there are signs of irritant poisoning in the stomach and intestines, or any inflammation of the bladder and kidneys resulting from the internal administration of abortive drugs. Note, further, any general marks of violence, especially on the abdomen; also the general characters of the viscera, *i.e.*, whether they indicate loss of blood during life such as commonly results from abortion.

Death during menstrual period.

393. If a woman die during the menstrual period, a thickened state of the uterus, a swollen condition of its mucous lining, and a generally increased hyperæmic appearance, are invariably found; it is well to bear this in mind, lest we mistake the appearances resulting from menstruation for those produced by abortion.

Presumption as to legitimacy.

394. Connected with the subject of abortion is that of "Legitimacy," regarding which we here venture to make a few remarks. The *presumption as to legitimacy* of the law of India is embodied in Section 112 of the Indian Evidence Act, and is as follows:—"The fact that any person was born during the continuance of a valid marriage between his mother and any man, or within two hundred and eighty days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of the man, unless it can be shown that the parties to the marriage had no access to each other at any time when he could have been begotten."

Grounds on which child's legitimacy may be disputed.

395. Hence, the legitimacy of a child may be disputed on either of two grounds—*viz.*, (1) on the ground that the alleged father of the child is impotent; or (2) on the ground that the parties to the marriage had no access to each other at any time when the child could have been begotten.

Medico-legal questions when legitimacy disputed.

396. The following examples show the medico-legal questions which may arise when legitimacy is disputed on the second of these two grounds:—

(1) A husband on a certain date ceases to have access to his wife; after a certain interval the wife is

delivered of a child. In such a case the legitimacy of the child may be disputed on the ground that the interval between the last access of the husband and the birth of the child was greater than the utmost period to which gestation can be prolonged.

(2) The parties to a marriage are proved, after a long period of separation, to have resumed access to each other on a particular date. After the lapse of a certain interval the wife is delivered of a child. In such a case the legitimacy of the child may be disputed, on the ground that the period intervening between the date of resumption of access and the date of the child's birth was so short that the child must have been begotten before access was resumed. If in such a case the appearance of the child at birth indicates it to be a mature child, the question arises, What is the shortest natural period of gestation? or, if the child is an immature child, What, judging from its appearance, was its uterine age at the time of its birth? Again, in such a case, it may be alleged that the mere fact that the child was born alive and capable of being reared, proves that its uterine age at birth was greater than the interval which elapsed between resumption of access and birth, thus raising the question—What is the earliest period of gestation at which a "viable" child can be born, *i.e.*, one capable of living and being reared? Moreover, as a portion of the evidence bearing on the question of early viability is derived from cases where a viable child has been born a short time after a previous delivery, and as such cases may be accounted for by "superfœtation" (*i.e.*, conception of a second ovum during gesta-

tion of a first), the further question arises, Is superfœtation* possible?

Questions in cases of contested legitimacy arise in divorce suits.

397. It may be here remarked that as his wife's adultery is a ground on which a husband may claim a divorce, questions similar to those arising in cases of contested legitimacy may arise in suits for divorce. The question as to the degree of maturity of a child may also arise in cases where a child is born soon after marriage, and where it is alleged that the parents must in consequence have had sexual intercourse before the marriage and are therefore of immoral character.

Case of how-long child lived after birth.

398. We need only remark, supposing a child to have been born alive and the question be asked—How long a period has probably elapsed since death?—that, as in the case of adults, we must be guided in forming our opinion by (*a*) the extent to which the cooling of the body has progressed; and (*b*) *post-mortem* rigidity; or, if the time be past for observing these, (*c*) the stage of putrefaction reached—and here the season and the extent of the exposure of the body to air must be considered, remembering that the body of an infant decays more rapidly than that of an adult. In water (where infants are often found), decay is slower than usual, if the immersion be complete, while it is more than usually rapid if the body be only partly under water.†

Examination of woman during life in case of abortion.

399. With regard to the examination of the woman during life, an IndianSurgeon of experience remarks that "with some persons all signs of delivery disappear within twenty-four hours." Admitting that this may be true (although such cases must surely be rare, seeing that the lochia rarely cease within a week or ten days), *à fortiori*, it must apply to abortion. And, on the other hand, admitting that

* The term *superfœtation* is used to imply the conception of a second embryo in a woman already pregnant, and the birth of two children at the same time, differing much in their maturity; or, of two births, at an interval one from the other. The possibility of such occurrences is now much doubted, although it was at one time a subject of considerable discussion.

† TIDY's *Legal Medicine*, pp. 286, 287.

there are cases where sufficiently indicative signs remain after intervals of fourteen, eighteen, and twenty-one days (and in one case, it is said, after a month), it is equally certain that, as a rule, where the examination has been delayed for a week, the medical evidence will be of an almost entirely negative character. Much, in such cases, will manifestly depend (1) on the state of health of the mother, and (2) on the period of gestation reached.

Symptoms to be observed before ordinary signs of abortion.

400. Before we proceed to discuss the ordinary signs of abortion, we have to remark—(1) that if the symptoms mentioned occur during the earlier periods of gestation, they are at most of an exceedingly evanescent character, whilst it is fairly open to question whether they are not as a rule entirely absent; and (2) that some, if not all the symptoms named, may be simulated by menstruation.

Signs of abortion in the glivin

401. The signs of abortion in the living are usually as follows; but it will, of course, be of primary importance to remark on all signs of violence to uterus or vagina; also whether there be an excessive inflammatory condition of the genital organs. Further, all marks on the body of the female which may indicate general violence for the purpose of effecting the object in view should be carefully recorded:—

(*a*) A relaxed condition of the vulva and passages, patulousness of the os uteri, the presence of the lochial secretion in the earlier stages, and a white mucous secretion at a later period, accompanied by that characteristic acid smell common to puerperal women.

(*b*) The distention of the breasts, yielding a flow of milk on pressure, with a fullness and knotty feeling for some time after aborting, are also observable.

(*c*) A general anæmic appearance from loss of blood, with sunken eyes will be noticed.

(*d*) A peculiar excitement of the pulse, with dryness of skin, is also invariably present.

(*e*) A speculum* may be needed to see the lacerations of the os uteri, but as a rule they may be felt by the finger.

Affiliation cases.

402. Although illegitimate children are regarded by law as the sons of nobody, their father is bound to contribute towards their support until they have attained a certain age. Hence a woman having been delivered of an illegitimate child may appear before a court and claim that a certain individual, who she alleges is the father of her child, may be compelled to so contribute. Such cases are called "affiliation cases," and in them questions may arise similar to those arising in cases of contested legitimacy.†

Determination of existence of pregnancy.

403. With regard to pregnancy, there are five principal cases in which the existence or otherwise of pregnancy may have to be determined, and which are as follow :—

(1) Where pregnancy is pleaded in bar of execution. In such a case in India, owing to the wording of Section 382 of the Code of Criminal Procedure, the question to be decided is simply—Is the woman pregnant or not? In England, however, owing to the terms of the charge to the jury of matrons, a medical man called in to their assistance may have to examine into the further question—Is the woman "with child" pregnant of a quick child?

(2) Where a widow is suspected of feigning pregnancy in order to ultimately produce a supposititious heir to the estate of which her husband died possessed. In such a case, according to the law of England, the heir-presumptive to the estate, *i.e.*, the person who would succeed thereto

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* An intrument which when inserted into the vagina enables the observer to see the condition of the mouth and neck of the womb and the state of the vagina itself.

† LYON's *Medical Jurisprudence for India*, 2nd ed., pp. 338—340.

supposing the woman not to be pregnant, may apply to the court to order an inquiry to be made into the alleged pregnancy. The court, if it grants the application, does so by issuing what is technically called a writ *de ventre inspeciendo.*

(3) Where the question is whether or no a woman is pregnant as the result of adulterous intercourse. The woman alleged to be pregnant may be a married woman living apart from her husband, and the allegation may be put forward in support of a suit for divorce, or she may be an unmarried female or a widow who has been defamed.

(4) Where the existence of pregnancy supplies a motive for murder or suicide.

(5) In cases of alleged causing, or attempting to cause, miscarriage. In such cases as the fact of the existence of pregnancy may support the allegation that an attempt has been made to cause miscarriage, the question whether or no a certain female is pregnant may arise. It should, however, be noted that an attempt to cause miscarriage is an offence irrespective of whether the woman be or be not pregnant. Further, according to the law of India (but not according to that of England), to cause or attempt to cause a woman "quick with child" to miscarry is a graver offence than if she be not quick with child. Hence in India, in these cases, the question may arise—Whether or no a certain female was quick with child at a particular time.*

These and other important points connected with the subject of abortion will be considered in the next chapter.

* LYON'S *Medical Jurisprudence for India*, pp. 332, 333.

CHAPTER IV.

ABORTION AND EXPOSURE OF INFANTS.

Abortion of infants—Miscarriage with or without woman's consent—Period of quickening—Methods of causing abortion and drugs used—Means employed for obtaining miscarriage—Doubts as to miscarriage—Suspicion of death from abortion—*Post-mortem* delivery of fœtus—Death from gangrene if stick breaks—Professional aborters—Responsibility for giving abortive drugs—Difference between English and Indian Law regarding abortion—Medical man applied to for abortive drugs—Premature confinement by operation—Pregnancy not necessary in England to establish crime—Blood in abortion—Exposure of infants—Anomaly as regards responsibility—Case of midwife claiming maternity of child—Supposititious children—Justifiable miscarriage—Premature expulsion of contents of uterus—Artificial induction of premature labour—Criminal miscarriage—Penal Code regarding miscarriage—Penal Code regarding effect miscarriage has on child—Attempt to cause miscarriage how dealt with—Causing miscarriage an offence in India—Causing miscarriage punishable in England.

Abortion of infants.

SECTION 312 of the Penal Code runs as follows: "Whoever voluntarily causes a woman with child to miscarry shall, if such miscarriage be not caused in good faith for the purpose of saving the life of the woman, be punished with imprisonment of either description for a term which may extend to three years, or with fine, or with both; and, if the woman be quick with child, shall be punished with imprisonment of either description for a term which may extend to seven years, and shall also be liable to fine.

"*Explanation.*—A woman who causes herself to miscarry is within the meaning of this section."

Miscarriage with or without woman's consent.

404. If this miscarriage is caused without the woman's consent, the person committing the offence is liable to imprisonment for ten years, or transportation for life; and if it is done with her consent, and she dies, to imprisonment for ten years.

Period of quickening

405. It will be observed that, to render the offender liable to the increased punishment under Section 312, it is

necessary to prove that the woman was "quick." Regarding the exact time when quickening * takes place, there is a considerable difference of opinion, and it is impossible to ascribe an exact period. In the cases which ordinarily come before the criminal courts, it is, of course, impossible to ascertain the date at which pregnancy commenced. "Quickening usually takes place between the fourteenth and eighteenth week, but sometimes as early as the twelfth. It is a very fallacious sign; for these movements may not be perceived at all, or they may be confounded with the motions of flatus, changes in the position of the viscera, or sudden contractions of the muscles" (Guy). It is manifest that, in criminal cases, it can ordinarily only be ascertained from the statement of the woman herself whether she was quick or not. It would, therefore, seem safe to follow Taylor in his division of intra-uterine life into two portions, as mentioned in the previous chapter, *viz.*, that of a fœtus up to the sixth month, and that of a quick fœtus from that time to the end of the pregnancy. It is probable that, if there is any evidence at all regarding the woman's pregnancy, there will be sufficient to fix the time approximately between four and a half to six months, and if the fœtus itself is found, the medical witness should, of course, be able to give a tolerably accurate guess at its age.

Methods of causing abortion and drugs used.

406. It is generally believed, that the offence of abortion is very common in this country. It is, of course, chiefly, if not entirely, practised by widows who wish to escape the consequence of an illicit connection. There are a variety of ways in which it is caused, but they chiefly consist in—(1) using abortificent remedies internally; (2) introduction of irritants into the female genital passages; (3) mechanical violence by substances introduced.† Chevers

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* By the term *quickening* is meant that period of pregnancy when the movements of the fœtus within the womb are first felt by the mother—usually about the seventeenth week.

† Dr. Shortt, of Madras, examined the body of a Hindoo female, where abortion had been effected by mechanical violence, and found the base or fundus of the womb perforated in three places.

enumerates the following: Arsenic, Amalgam of Tin, Sulphate of Soda, Silicate of Potash; Sulphate of Copper; Wood-charcoal; Capsicum seeds; Upang or "*Achyranthes aspera*"; Chitta, "*Plumbago zeylanica*"; Lall chitra "*Plumbago rosea*"; root of *Nerium oleander*," 6 inches long, tipped with asafœtida; opium; a powder which contains black pepper, burnt sulphate of copper, and cantharides; asafœtida. Although drugs to be taken internally, are often administered, the most usual means adopted is by introducing the *Lall chitra* branch into the mouth of the womb. This branch is generally rubbed with asafœtida. It must, however, be remembered that asafœtida is also commonly used among natives in child-bed, either alone or in combination with other drugs, to keep cold out of the system, and also as prophylactic against tetanus, and to assist the lochial discharge.* The mere fact, therefore, of finding asafœtida in the house should not be held as a proof that it had been used for a criminal purpose. Besides the above means, Chevers also gives the following :—

(1) *Unripe pine-apple.*—A green unripe-pine-apple, about half grown, is made into a pulpy mass, and administered internally with a small quantity of salt. This is employed only during the first three months of pregnancy.

(2) *Atrendo (Calotropis Hamiltonii).*—This is used both internally and externally. The milky juice is mixed with flour and given as a pill; a rag is then dipped in the juice and folded round a small stick. About four and a half inches are introduced *per vaginam*. This plan is employed in all stages of pregnancy. It is, perhaps, the least perilous of the many dangerous methods as regards the mother. It should be remembered that the inducement of abortion is *always* associated with risk to the life of the mother.

* The *lochia* is the discharge that takes place from the genital organs during two to four weeks succeeding labour.

(3) *Lunka Suj (Euphorbium nivulia).*—This is said to be more efficacious than all the rest. A twig, about seven inches long and of appropriate size, is selected and well anointed with good asafœtida; and as the twig itself is soft, and consequently difficult to introduce per vaginam, it is prepared for use by inserting in its centre a slip of bamboo stick, which gives it stiffness. The application of the stick produces abortion in twelve hours. This method is employed at all periods of pregnancy. The fœtus is never delivered alive.

(4) *Upang (Achyranthes aspera).*—This root is used by the natives as a tooth brush, and is employed in the same way as the *lunka suj.* The effect is produced in from eight to twelve hours. It is certain in its action and is used at any period of gestation. The child is not necessarily born dead.

(5) *Shet korobee (Oleander).*—This is used in the same way. If applied in the evening, the fœtus is expelled during the night. It is used at any period of pregnancy.

(6) *Sujna bark.*—A decoction, mixed with black pepper corms, is given. This is very dangerous, and the woman, as a rule, dies with the fœtus.

(7) The Lall Chitra is also dangerous. The fœtus is always expelled dead, and the woman also frequently dies.

Means employed for obtaining miscarriage.

407. In the *Medical Times and Gazette* for January 1867, Dr. Shortt, of Madras, gives a series of cases showing the use to which the juice of the bamboo leaves is put as an abortifacient. The *Caloptris gigantea* and the root of *Plumbago zeylanica,* he states, are applied to the mouth of the womb for the same purpose as the juice of the *Euphorbium torucali.* CHEVERS also enumerates various other drugs which are given *internally* in order to produce abortion, such as the seeds of the paw-paw tree, arsenic, pills of

soda and carrot seeds, carrot seeds and mortar, and the milky juice of the *mudar*. Other mechanical means are—the root of the tamarind tree (very common), root of the white oleander, and the bruised marking-nut (*Semecarpus anarcardium*).

Doubts as to miscarriage.

408. It may be remarked that it is possible, in the case of means being used which are not invariably attended with danger to the woman or the fœtus, the question might arise as to whether this would come under the heading of a "miscarriage." If the fœtus is, as a rule, born alive after the employment of such means, it seems doubtful whether it could be called a miscarriage.

Suspicion of death from abortion.

409. In May 1854, the body of a Hindu woman, who had died under suspicious circumstances, was brought to Chevers' hospital at Howrah (near Calcutta) in a very advanced stage of decomposition. "The native doctor informed me (Chevers) that, when placed in the dead-house, it appeared in a natural condition. I however found the womb between the thighs of the corpse, evidently by the gaseous distention within, and lying beside it, and evidently having recently escaped from its cavity, the body of a fœtus of about four months, greatly decomposed, and a portion of the *Lall chitra* root, seven and a half inches long, and rather thicker than a common writing quill. This had been scraped and was thickly coated with adhesive inflammatory deposit."*

Post-mortem delivery of fœtus.

410. In connection with this subject, the following extract from Mr. Van Steyzel's report for 1890 will be of interest :—The corpse of a woman was dragged out of a well, and as the cause of death could not be ascertained at the inquest, the body was conveyed to the local dispensary

* Baboo Kannai Lal Dey, Rai Bahadoor, in his "Indigenous Drugs," says the Lall Chitra is used to arrest hæmorrhage after abortion or confinement, and hence its mere presence is no indication of its being the cause of the abortion. Motive and time of use must be proved to certify that it caused the abortion. Dr. Cullen met with a case in which a piece of Lall Chitra was found in the vagina of a corpse. He mentioned the possibility of its having been used to arrest hæmorrhage. The person accused of causing the abortion got off.

by the police; on getting ready for the *post-mortem* examination, a dead fœtus dropped out of the winding sheet to the astonishment of the by-standers, *post-mortem delivery* having occurred on the way unnoticed by the bearers of the corpse. There were no signs indicating that any attempt to cause abortion had been made; there were no signs of drowning; the fœtus was seven or eight months old, and its delivery was accompanied by total *inversion of the uterus*.* Under these circumstances, the woman being a widow, it was suspected that she died from the result of a drug taken to procure abortion, and that her paramour had cast the corpse into the well to veil the cause of death. Strychnine was found in the viscera sent. The occurrence of child-birth after the life of the mother had become extinct without the aid of art—and, indeed, even after interment—has been recorded and avouched by many observers of established credit, the independent contractile power of the uterus, or cadaveric rigidity, being stated to be the chief factors in the production of this accident. So-called "cadaveric spasm" also is known to occur at or after death by strychnine poisoning, and to persist till true cadaveric rigidity comes on, disappearing only with it. In the present instance, the body must have lain for about eighteen hours in the water; cadaveric rigidity had all but passed away at the time of examination (the upper limbs only being slightly stiff); and, no doubt, expulsion of the fœtus occurred by the pressure of the gaseous products of putrefaction which filled the abdomen. The possibility of this accident occurring is a point in obstetric jurisprudence which should not be forgotten when examining the dead body of a female alleged to have miscarried. A similar case also occurred to Dr. Clementson at Berhampore, in 1866. In that instance the woman was married, but her husband had been away for about three years; and a case occurring at Patna is recorded of the fœtus being expelled

* *Inversion of the womb* is that condition in which it is turned wholly or partially inside out, by the fundus or highest part descending through the mouth of the womb.

by the action of the gases, generated by decomposition whilst the body was being conveyed to the hospital.

Death from gangrene if stick breaks.

411. It frequently happens that the stick used for causing abortion gets broken off and remains inside the womb, and eventually causes death by gangrene.

Professional aborters.

412. It is probable that only very few of the cases in which abortion has been caused come before the courts. When death follows it is, perhaps, impossible to avoid an enquiry; but in the majority of cases the operation is performed by old women who practise it as a profession. A considerable amount of skill is employed in the manipulation, and where a means is employed, which is of no danger to the mother, it is probable that it leaves scarcely any traces behind which would justify a medical witness in saying that a violent abortion had been caused.

Responsibility for giving abortive drugs.

413. In a recent case in England, a man was indicted for the murder of a woman. It appeared that she, being pregnant, requested him to induce abortion, and that he, in consequence, procured for her a poisonous drug. He knew the purpose for which she wanted it, and gave it to her for that purpose; but he was unwilling that she should use it, and he was not present when it was taken. The woman died from the effects of the poison. The court held that the conviction could not be sustained, saying that it would be consistent with the facts of the case that he hoped and expected she would change her mind and would not use the drug. (Reg. *v.* Fretwell, quoted by Mayne, Penal Code). "Under similar circumstances," adds Mr. Mayne, "I conceive that no charge would be maintainable under Sections 314, 312, 313, or 315, but the prisoner would be guilty of abetting her to commit the offence."

Difference between English and Indian law regarding abortion.

414. There is a difference between the English law and the Indian law on one point, *viz.*,—Under English law, if a person administers violence to a pregnant woman, or a potion, and brings on labour, in which the child is born

alive but subsequently dies on account of the bruises received or the potion administered, he is liable for murder; whereas under the Indian Penal Code he would be liable, under Sections 315 or 316, to a term of imprisonment extending to ten years.

415. Taylor quotes a case, occurring in England, in which certain persons applied to a medical man to give them drugs in order to cause abortion. He informed the police, and then sold them some harmless drugs, and as it is not necessary, under the English law, that any specific injury should be done to the woman in order to complete the offence, they were tried for felony. In this case the medical man went too far, and his conduct called down some severe observations. There was no harm in his informing the police, but he ought to have refused to sell anything at all for such a purpose. In this country, under similar circumstances, the prisoners would probably be convicted of an attempt.

Medical man applied to for abortive drugs.

416. It must be remembered that cases often occur when, owing to mal-formation of the pelvis, the medical attendant considers it necessary to bring on premature confinement. This operation should only be carried out after the exercise of extreme caution, and after a consultation with another practitioner, since otherwise the operator would lay himself open to a charge of unlawfully causing abortion. And it is quite clear that, unless every precaution is taken, there would be a wide opening for criminal practices. In this country, it is improbable that at the present day such a plea would be raised, but medical education is rapidly spreading, and it may at no remote period transpire that each village will have its trained medical practitioner. Under such circumstances, there might be temptation for unscrupulous men to wilfully and criminally cause abortion, and then plead the necessity of inducing premature confinement. Unless he could show good causes for the operation, the presumption would be against him. If the ex-

Premature confinement by operation.

pulsion was caused in an early stage of gestation (or pregnancy), the presumption would be very strong, as, in English practice, the induction of premature labour is rarely had recourse to until after the seventh month of gestation.

Pregnancy not necessary in England to establish crime.

417. Under English and French law, it is not necessary that there should be proof of pregnancy in order to establish the crime of abortion. A woman has been convicted of an attempt to cause abortion in another female who was subsequently proved not to be pregnant but to be suffering from ovarian* disease. In the same way, if the woman was suffering under a morbid growth in the womb, such as a *mole*,† the person who has used the means with *intent*, may still be convicted of an attempt to cause abortion (TAYLOR).

Blood in abortion.

418. As regards the *blood* in abortion, all the leading authorities remark that there is no difference in the blood produced in abortion and menstrual blood. This question was referred to the French Academy, and a report was made to the effect that there was no method by which the blood of menstruation could be distinguished from blood discharged in abortion or from blood in infanticide. Taylor, however, remarks that the *liquor amnii*‡ contains a considerable quantity of albumen,§ and that this liquid is calculated to stain and to stiffen the fibre of any stuff on which it has been effused. As gestation advances, the amount of albumen in the liquid decreases. At the fourth month it forms 10·77 per cent. of the liquid, at the fifth month 7·67, at the sixth month 6·67, and at the ninth month only 0·82 per cent.

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* Pertaining to the ovaries, which are two glandular bodies situated one on each side of the uterus, and which correspond with the testicles in the male.

† *Moles* are masses of berry-like vesicles or cells attached to the after-birth, and produced by a kind of degeneration of the vessels of the placenta first developed.

‡ The *Liquor amnii* is the liquid in which the fœtus lies.

§ *Albumen* is a substance resembling the white of egg.

419. Exposure of newly-born infants is a crime of very ordinary occurrence. It is seldom that any other points of medico-legal importance will arise than those that have already been discussed. It is wonderful how long children exposed will sometimes survive. Mr. Gribble tried a case in Cuddapah in which a woman was charged with causing the death of her newly-born child by throwing it into some prickly-pear bushes. The child was found next morning alive. The umbilical cord was not tied, and it had been injured by thorns. The bushes in the midst of which it was found were so high, that it must have been thrown high in the air over them. The child survived for more than a day, and then died of the injuries received and exposure. The woman was convicted of murder but the sentence was reduced. Exposure of infants.

420. As regards exposure, Mr. Mayne points out a very curious anomaly. In his remarks on Section 317, he says: "In a recent case the following facts arose:—A, the mother of a newly-born child, being herself too ill to move, sent B to expose it. It was held by Scotland, C.J., that A could not be convicted under this section, as *she* had not actually exposed the child, nor B, as she was not the mother; also that neither A nor B could be indicted for abetting the other, since, as neither could have committed the offence, there could be no abetment by the other. A person who has the custody of a child, *merely for the purpose of exposing* it, cannot be indicted as a person "having the care of such child." This is a legal fiction with a vengeance, but it would seem, that though they might escape the penalties of Section 317 ("exposing a child by a father or mother"), B might very properly be indicted for murder, *i.e.*, causing death by doing an act with the intention of causing death, or, if death did not follow, with attempt at murder, and A might then be charged with abetment. Anomaly as regards responsibility.

421. CHEVERS (*Medical Jurisprudence for India*, page 73) relates the case of a Native midwife who took away a Case of midwife claiming maternity of child.

woman's child and attempted to deceive those about her by pretending to go through the lying-in process herself. The civil surgeon and midwives examined her and deposed that she presented no signs of recent delivery. She was sentenced to seven years imprisonment.

Supposititious children.

422. By a "supposititious child" is meant, a child produced by a woman who avers it to be hers when it is not. In these cases the motive is generally to further an attempt either to extort money or to divert succession to property. A supposititious child may be (1) produced by a woman who has never been delivered of a viable child; or (2) produced by a woman in substitution for a child of her own. In the first case, besides questions similar to those in legitimacy cases, the following additional questions may arise, namely,—(*a*) Is this woman sterile? and (*b*) does this woman show signs of having been recently or previously delivered of a viable child? In the second case it is very seldom that medical evidence can afford any assistance. In both cases, as in affiliation cases, the question of how far the paternity of a child can be inferred from its resemblance or non-resemblance to its alleged parents, may also arise.

Justifiable miscarriage.

423. Section 312 of the Indian Penal Code, defining the offences of causing miscarriage, formally excepts, as not criminal, miscarriage caused "in good faith and for the purpose of saving the life of the woman." The law of England does not formally define under what circumstances it is lawful to cause miscarriage. Usually, justifiable miscarriage takes the form of "artificial induction of premature labour," *i.e.*, the operation is deferred until the child has attained viability, so that, if possible, its life as well as that of the mother may be saved. So long, however, as the operation is undertaken for the purpose of saving the life of the mother, miscarriage may be legally caused at any period of pregnancy.

424. For the purpose of saving the mother's life, it may be necessary to cause premature expulsion of the contents of the uterus:— Premature expulsion of contents of uterus.

(1) In cases where, from pelvic distortion, the antero-posterior diameter of the pelvis (normally $4\frac{1}{4}$ inches at the brim and $4\frac{2}{3}$ inches in the cavity) is reduced below, or to, $3\frac{1}{4}$ inches.

(2) In cases of obstruction, caused by the presence of tumours or contraction of the soft parts, arising from cicatrices of such a nature as to prevent the passage of a mature child.

(3) In cases where, during gestation, the mother's life is endangered by obstinate vomiting, hæmorrhage from *placenta prævia,** convulsions, or serious cardiac, pulmonary, or other disease.

425. MEADOWS and others advise the artificial induction of premature labour in "cases where there is evidence that on several previous occasions the death of the fœtus occurred at a given time suddenly." "Here," writes MEADOWS, "the operation would be resorted to prior to the period in question with the view of preventing its occurrence." To cause miscarriage under these circumstances is, by the law of India, not justifiable, unless there is reason to believe that the child's death will endanger the life of the mother. Artificial induction of premature labour.

426. Criminal abortion or miscarriage is common in many countries, the object being to get rid of the product of illicit intercourse. In India, the custom of preventing the re-marriage of widows tends directly to increase the prevalence of the offence; in fact, in by far the great majority of cases of this crime, the female who has miscarried is a Hindoo widow. This, however, is not invariably the case. Criminal miscarriage.

* *Placenta prævia* is applied to those cases in which the placenta or after birth is situated internally over the mouth of the womb, often causing excessive hæmorrhage.—*Mayne.*

Penal Code regarding miscarriage.

427. The sections of the Indian Penal Code relating to the offence of causing miscarriage are as follow :—

"312. Whoever voluntarily causes a woman with child to miscarry, shall, if such miscarriage be not caused in good faith for the purpose of saving the life of the woman, be punished with imprisonment of either description for a term which may extend to three years, or with fine, or with both, and if the woman be quick with child, shall be punished with imprisonment of either description for a term which may extend to seven years, and shall also be liable to fine.

"*Explanation.*—A woman who causes herself to miscarry is within the meaning of this section.

"313. Whoever commits the offence defined in the last preceding section without the consent of the woman, whether the woman is quick with child or not, shall be punished with transportation for life, or with imprisonment of either description for a term which may extend to ten years and shall also be liable to fine.

"314. Whoever, with intent to cause the miscarriage of a woman with child, does any act which causes the death of such woman, shall be punished with imprisonment of either description for a term which may extend to ten years, and shall also be liable to fine; and if the act is done without the consent of the woman, shall be punished either with transportation for life or with the punishment above mentioned.

"*Explanation.*—It is not essential to this offence that the offender should know that the act is likely to cause death."

Penal Code regarding effect miscarriage has on child.

428. Two other sections of the Code refer to results which may arise to the child from the doing of certain acts before its birth, namely :—

"315. Whoever, before the birth of any child, does any act with the intention of thereby preventing that child from being born alive, or causing it to die after its birth, and does by such act prevent that child from being born alive, or causes it to die after its birth, shall, if such act be not caused in good faith for the purpose of saving the life of the mother, be punished with imprisonment of either description for a term which may extend to ten years, or with fine, or with both."

"316. Whoever does any act under such circumstances that, if he thereby caused death, he would be guilty of culpable homicide and does by such act cause the death of a quick unborn child, shall be punished with imprisonment of either description for a term which may extend to ten years, and shall also be liable to fine."

Attempt to cause miscarri-

429. Attempts to cause miscarriage may be dealt with either by the application of the provisions of Section 511 of

the Penal Code to Sections 312 or 313, or, if the attempt has been made by the administration of an unwholesome drug or other things, the case may be dealt with under Section 328.

age how dealt with.

Causing miscarriage an offence in India.

430. Hence, by the law of India, to voluntarily cause or attempt to cause "miscarriage," except in good faith for the purpose of saving the life of the woman, is an offence. Further, supposing it to be proved that such an offence has been committed, the following additional questions are, owing to the wording of the above-quoted sections, liable to arise:—

(1) Was the woman pregnant? Proof of pregnancy is required to secure a conviction for causing miscarriage, but not to secure conviction for an attempt.

(2) Was the woman quick with child?

(3) Was the miscarriage caused, or the attempt to cause it made, without the consent of the woman?

(4) Did the woman's death result from miscarriage or the attempt to cause it?

(5) In certain cases (see Sections 315 and 316) did the death of the child result from an act done before its birth?

Causing miscarriage punishable in England.

431. In England, causing miscarriage is punishable under Sections 58 and 59 of 24 and 25 Vict., Cap. 100, as amended by 27 and 28 Vict., Cap. 47. It may be noted that under these sections—(1) the question of pregnancy only arises when a woman is accused of doing an act with intent to procure her own miscarriage; (2) that the question of quickening does not arise at all; and (3) that these sections do not, like those of the Indian Code, expressly provide that the absence of the woman's consent aggravates the offence. Further, in England, if the death of the woman or child results, the ordinary law of homicide applies.*

* LYON'S *Medical Jurisprudence for India*, pp. 372—374.

CHAPTER V.

UNNATURAL OFFENCES—SODOMY, BESTIALITY.

What constitutes sodomy—Peculiarities of sodomites—sodomites affect society of their own sex—Sodomites free from hereditary taint—Medical appearances of sodomites—Genital organs of sodomites—Appearance of anus of sodomites—Marks of violence on sodomites unusual—*Post-mortem* examination of sodomites—Statements of medical witness—Examination in cases of sodomy—Definition of bestiality—Human spermatozao and animal hairs—Examination in cases of bestiality.

THE crime of Sodomy is by no means uncommon in India, nor is it in this country viewed with the same degree of horror and repulsion that it is in Europe. Happily, we hear of fewer cases now than in days gone by. The Authors have, however, had to deal with several instances both of sodomy and bestiality. In connection with sodomy the term "active agent" is employed to signify the male person who effects intercourse, and "passive agent" implies the male or female on whom intercourse is practised.

What constitutes sodomy.

432. In order to sustain a charge of sodomy, it is only necessary to prove penetration, and if this has been effected, the crime of sodomy has been committed, whether the consent of the passive agent has or has not been obtained. Proof of the emission of semen is not necessary. The age of the passive agent does not affect the heinousness of the crime; nor does the sex of the passive agent affect the crime, it being the same in the female as well as in the male. With regard to the matter of consent, it should be remembered that it is impossible to commit this crime to consummate the act against the will of the passive agent, whilst the latter is in her senses. The slightest resistance is enough to prevent it, and it almost goes without the saying that the crime cannot be committed whilst the passive agent is asleep. With regard to the question of age, if the active agent is over 12 and the passive agent under 12, the former alone is indictable for felony; if both are over 12, both are indicted

If the active agent be under 12 and the passive agent over 12, the latter alone is indictable. The guilty associate is a competent witness, but as a *particeps criminis* his evidence is subject to confirmation.

433. Sodomites are persons of all ages, but they usually present a somewhat feminine appearance, or strive to appear like women. To this end they commonly conceal or destroy, as far as practicable, such virile appendages as beard, whiskers, or moustache, wearing a profusion of jewelry, paint, and padding. So far, indeed, may this liking go, that in one case a male to the death is said to have passed himself off as a female, being employed evidently as a passive agent. Peculiarities of sodomites.

434. And yet, curious to say, sodomites generally affect the society of their own sex and avoid that of the opposite sex. To them natural sexual intercourse is frequently a matter of absolute distaste. Their pose, it will be observed, is often statuesque, as it is not at all unusual to find in the case of those addicted to masturbation. Sodomites affect society of their own sex.

435. It may be remarked that undoubted sodomites are to be found with none of the characteristics just described and free from all hereditary taint. Full to the brim of natural sexual indulgence, which by over indulgence has ceased to be pleasurable, they now take refuge, from a desire of change and a yearning for extraordinary excitement, in unnatural connections. Sodomites free from hereditary taint.

436. We have now to consider the medical appearances resulting from the practice of sodomy. And since those addicted to the crime are accustomed to alternate characters, the effects both of *active* and *passive criminality* will commonly be found in and upon the same person. Of course, this will not apply to cases where boys are the victims and passive agents only, where the conditions indicate that the gratification was probably in the passive form only. Medical appearances of sodomites.

Genital organs of sodomites.

437. The parts of generation are in many cases more than usually relaxed and the scrotum pendulous. According to Tardieu, the penis is commonly found elongated and the glands more than usually bulbous and conical.

Appearance of anus of sodomites.

438. The natural folds about, and radiating towards, the anus, rapidly become obliterated by repeated acts, giving the skin of the part a *smooth appearance*. Moreover, a peculiar funnel-like depression or hollow of the nates towards the anus is usually observed. But here, again, much caution on the part of the medical jurist is needed, as the funnel-like depression, with obliteration of the rugæ, results from other than criminal practices, such, for instance, as the daily necessity that occurs in the case of some people for pushing back piles or slight protrusions of the rectum forced out during defæcation. When a young child has been recently violated for the first time, redness and itching, with pain on separating the thighs (as in walking) and on defæcation, will continue for some days at least, whilst it is not improbable that excoriations and partial lacerations of the margin of the anus may be found. In boys, however, accustomed to repeated acts of intercourse, these symptoms are not so marked, but fissures and ulcers are occasionally met with. It must be admitted, however, that lacerations and local injuries often disappear rapidly.

Marks of violence on sodomites unusual.

439. Marks of violence, other than local injuries, are not common in these cases, because the act is usually committed with consent.

Post-mortem examination of sodomites.

440. At a *post-mortem* examination in such cases, it will be advisable to note whether there is evidence of the boy or adult having been gagged. Further, it must not be forgotten that dilatation of the rectum and protrusion of the intestines through the anus are common effects of putrefaction. A gaping anus, with a thickened mucous membrane at its margins and smoothness of the skin around, are the characterists specially to be looked for; while chancres or

scars of chancres on the mucous membrane of the rectum would be specially significant.

441. A medical witness having found certain of the characteristics described, should not state that the crime of sodomy had been committed, but— Statements of medical witness.

(1) He should depose to certain appearances, etc., observed by him, and be content with stating whether or not they are consistent, in his opinion, with the commission of the crime.

(2) He should also state whether such characteristics may or may not, in his opinion, have occurred from natural causes.

(3) He should also state whether, in his judgment, appearances of any kind exist in or about the anus suggestive of *passive* criminality or about the penis suggesting *active* criminality. At the same time, the court should be given clearly to understand that the absence of such signs constitutes no absolute proof of the non-commission of sodomy or allied practices.

(4) That in many forms of unnatural immorality, such as Tribadism,* etc., we should not expect to find any characteristic appearances whatsoever. Medical evidence in such cases must, therefore, be negative.

The general appearance and habits of the accused should be noted as follows in cases of sodomy and bestiality :— Examination in cases of sodomy.

A.—Examination in cases of Sodomy.

I.—General appearance—

(*a*) Is the accused manly or womanly in appearance ? (Remark on the hair, voice, etc.)

(*b*) Does he strive to appear feminine in his dress ?

(*c*) Does he affect the society of men in preference to that of women ?

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* *Tribadism* unnatural and immoral practices between woman and woman : formerly called "Lesbian love."

II.—Examination of the genital organs—

(*a*) Are the genitals relaxed and pendulous—well or ill developed? Are both testicles in the scrotum, and of normal size?

(*b*) Is the penis at all elongated or twisted, and the glans more than usually bulbous and conical?

(*c*) Are there any signs of old or recent syphilitic disease?

(*d*) Note the presence or absence of hernia,* etc.

III.—Examination of the nates (or buttocks) and anus—

(1) In chronic cases note—

(*a*) Are the nates plump or lean, smooth or rugose?

(*b*) Does the space between the nates present a smooth funnel (or trumpet) shaped depression, tapering towards the anus.

(*c*) Is the rugose state of the skin immediately around the anus well or ill marked.

(*d*) Is the anus gaping or the sphincter† relaxed?

(*e*) Are there any scars indicating old lacerations of the sphincter ani?

(*f*) Does the person suffer from piles, fistula,‡ protrusion of the bowel, etc.?

(*g*) Are there any signs of syphilitic disease or of gonorrhœa, and if so how long have they probably existed?

(2) In acute cases—

(*a*) Is there much smarting, burning, or inflammation about the anus and rectum—more

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* *Hernia* commonly applies to the descent of a part of the bowel to an unnatural position.

† The *Sphincter* or *Sphincter ani*. ‡ *Fistula in ano*.

particularly is there pain in walking and on defæcation ?

(*b*) Are there any lacerations of the sphincter, or chancres on or within the anus, or discharge from the rectum to be detected ?

(*c*) (Specially in children and women) are there any spots of semen on the garments ? If so, note their precise position ?

NOTE.—The medical jurist must endeavour to form an opinion whether the person charged be both actively and passively criminal.

B.—EXAMINATION IN CASES OF BESTIALITY.

442. Bestiality is a form of sodomy in which there is immoral connection of human beings with lower animals. Much has been written with regard to the kind of evidence that may be employed in supporting such charges, but in our opinion the only medical evidence which is of any real value is the finding of human spermatozoa on the person, hairs, or clothes of the animal, or the finding of the hair of the animal on the active agent. Definition of bestiality.

443. On the other hand, it must be remembered that human spermatozoa differ considerably in size and even in outline, according to the age, vigor, and other qualities of the person from whom they have been derived. The *mere* presence of animal hairs on a man's coat and trousers can constitute very slight evidence of guilt, although, if the hairs of an animal be found adhering to stains of blood, mucus, or semen, on the underclothing of the man accused, the fact will be of considerable significance. Small hairs, which may be compared with those of the beast with which the connection had been attempted, may often be found under the prepuce or at its junction with the glans, and possibly some abrasions may also be discovered. We may add that it is impossible in the case of the blood stains to assert that the blood has been derived from any one animal specially. Human spermatozoa and animal hairs.

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444. The following points should be noted in examinations in cases of bestiality :—

Examination in cases of bestiality.

I.—Examination of the person—

(1) Are any hairs to be found under the prepuce or about the genital organs, or embedded in blood spots, seminal stains, etc., or on the clothes, corresponding to the hairs of the animal with which the crime was supposed to have been committed ?

NOTE.—In the case of a woman, the appearances may simulate those of rape.

II.—Examination of the animal—

(*a*) Are there any stiff, dry, semen-like spots around the vagina of the animal ? If so, remove the hairs and examine them microscopically.

NOTE.—If spermatozoa be discovered under the microscope, it must be determined whether or not they are human ?

(*b*) Are any abrasions indicative of force to be found about the genitals.

NOTE.—In these cases, if excoriations and lacerations, liable to bleed, and more particularly spots of blood, be found on the victim or passive agent or animal, the existence of corresponding blood marks on the accused will constitute important evidence, although it may not be possible to prove that the origin of the several spots is one and the same.*

445. In the case of a female, if seen quickly after the event, excoriations and other signs of rape might possibly be detected, but this is extremely doubtful.

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* TIDY'S *Legal Medicine*, pp. 233-234.

SECTION IV.—LIFE INSURANCE AND INSANITY.

CHAPTER I.

LIFE INSURANCE.

Life insurance defined—Policy of insurance—Various forms of insurance—Life Insurance Companies—Uncertainty of human life—Life insurance how based—Life insurance considered with Willich's formula—The term "Life Table" defined—English Life Tables—Health of applicant for insurance—Medical examination—Remarks on life insurance—Details of examination for life insurance—Nervous system of applicant for insurance—Pulmonary diseases of applicant for insurance—Urinary diseases of applicant for insurance—Occupation of the applicant for insurance—Other condition in applicants for insurance—Family history of applicant for insurance—Testing the urine—Albumen as affecting life risk—Persistent albuminuria—Specific gravity of urine—Microscopic test of urine—Indication of diabetes—Diseases requiring special remarks—Cancer—Corpulency—Phthisis and lung diseases—Phthisical tendency in descendants—Satistics of phthisical patients—Analysis of phthisical patients—Rules regarding lives of consumptives—Addition to life—Adverse influences in life insurance—Table of average expectation of life—Expectation of life reduced in India—Discharge from the ear—Gout—Heart disease in insurance—Rhematism in insurance—Stricture of the urethra—Enlargement of liver—Enlargement of spleen—Legal points—Material concealment—Medical examiners—Concealment by applicant—Risk of concealment—Intemperance in insurance—Burden of evidence—Abstinence in insurance—Accidental cases of death in insurance—Suicide in insurance—Murder for insurance.

LIFE Assurance is a contract by which the *insured* pays to the insurers a certain amount of money, either in a lump sum, or by monthly, quarterly, or half-yearly instalments, in lieu of which payment the insurers agree to pay a certain sum of money to the executors or assignees of the assured at death, or to the insured himself on his attaining a certain age, whichever may first occur (the age being agreed upon at the time of making the contract). This amount is proportionate to the risk and is called the *premium*. Life insurance defined.

446. Although insurance is a mutual contract, a written document on stamped paper, and known as the *policy*, is by law required to make it binding on both the insurer and the insuree. Policy of insurance.

Various forms of insurance.

447. Insurances are sometimes made for a certain number of years, payment of the sum assured being made only if the person die within the period of the insurance contract. There are, of course, various other forms of special insurance contracts which may be entered upon.

Life Insurance Companies.

448. The three chief kinds of Life Insurance Companies are—

(1) *The Mutual*, in which, after paying the expenses of management, the whole of the profits are divided among the insured.

(2) *The Mixed*, in which the insured participate in a portion of the profits, the rest being divided among the proprietors.

(3) *Proprietary Companies*, in which a fixed sum is paid, the profits being divided only among the proprietors. Each of these modes of insurance has its advocates.

Uncertainty of human life.

449. There is scarcely anything more uncertain than the duration of any particular human life, yet, on the other hand, there are few things more certain than the average duration of a number of such lives. In the case of a healthy life, and one not exposed to any unusual risk, all that the Insurance Company require in granting a policy is to know the exact age of the applicant.

Life insurance how based.

450. The entire system of life insurance is based on the probable duration or *expectation of human life* and the value of the contributions of the various members of the assurance society placed at compound interest. It will be necessary, for the purposes of this book, to consider the question from two points of view, namely,—(1) Medical, and (2) Legal.

Life insurance considered with Willich's formula.

451. The phrase "expectation of life" or after life-time, means the probable age to which any one person, of a given population and place, may live. This is ascertained

from the rate of mortality found to prevail within that area, regard being had to the age of the person at the time of fixing the expectation. For practical purposes, within the ages of 25 and 75 years, Willich's formula shows approximately the expectation. It is as follows:—Expectation of life = $\frac{2}{3}$ (80—x), x being the age of the person at the time. Expectancy (say) at 30 years of age would be $\frac{2}{3}$ (80—30) = 33·33 years. According to this formula, a person 30 years of age, in good health, may be expected to live to the age of 63·3 years. Several methods have been proposed by which the probable duration of life may be approximately determined, and Life Tables of various kinds have been drawn up for this purpose.

452. *A Life Table* is a table showing at a glance the probable duration of life at any given age. The Breslau Table of Mortality, constructed by Halley from the Registers of the town of Breslau in Silesia, was the first one in use, and was published in the year 1693. No material for the preparation of such a table was at that time available in England, because the ages at death were not recorded. The term "Life Table" defined.

453. The "English Life Tables" of Dr. Farr are founded on—(1) a comparison of the deaths and the living at each age, giving the rate of mortality and survivorship; or (2), the deaths alone, or with reference only to the ages at which the deaths have taken place. The former is the more correct and the more generally applicable; the latter is applicable, if the population is stationary (that is, if the births and deaths are equal), and when no disturbing migration has occurred for a century. The H. M. (healthy males) and H. F. (healthy females) Tables of the Institute of Actuaries of Great Britain are also in use. There are other forms of Life Tables employed, but they are all based on the same principle. English Life Tables.

454. The expectation of life being known, the next matter to settle is, whether the applicant is healthy or Health of applicant for insurance.

otherwise. That an inquiry may be made into this point, it is necessary for the applicant to give the names of the various medical men who have attended him at different times, and that he should answer a list of questions sent him by the Insurance Company; and lastly, that he submit himself for examination by a qualified medical practitioner, who is usually appointed by the Company. This leads us to the subject of the Medical Examination.

Medical Examination.

455. The method of investigating the condition of health of candidates for life insurance is identical with that pursued in diagnosing a case of illness, but as there are certain diseases, tendencies, and peculiarities of constitution which tend to decrease the duration of life, the medical examination comprehends an inquiry into these special states likewise. But Insurance Companies now require more than an accurate investigation of the physical condition and of the family and personal history of applicants; for, having obtained these data, a great deal depends on their correct interpretation, which must be left, to a considerable extent, to the judgment of the examining physician. This is often a matter requiring much deliberation and refinement of judgment.

Remarks on life insurance.

456. The following remarks may, therefore, not be out of place:—Dr. Symes Thompson, in his lectures on life assurance at the Gresham College, said,—"It is not a very easy matter to decide, by simply one personal visit and examination, whether a person is likely to live ten, twenty, or fifty years, but that is a question that the Assurance Doctor is called upon to decide every day of his life, and in a manner which often involves his office in great responsibilities, which responsibility is sometimes not limited to £1,000, £2,000, or even £100,000. For while, in practice, the patient lends all the assistance he can to his examining physician, calling attention to anything he believes amiss with his health and laying stress on all his symptoms, the applicant for assurance naturally appears at his risk, and

often unconscientiously rather tries to conceal any departure from health. The greatest care, therefore, must be exercised in making the physical examination and in filling in the details in the forms supplied by the offices."

457. In carrying out an examination for life assurance, the physician first carefully peruses the statements made by the applicant respecting his previous health and family history. He then makes inquiries regarding the habits of life. Should there be any heat of skin, the temperature is at once taken. This is followed by a systematic investigation as to the condition of the various "systems" and organs of the body.

Details of examination for life insurance.

458. With regard to the *nervous system*, the physician especially investigates paralysis and affections of the special senses. He inquires into any family tendencies to neurotic (or nervous) affections—chorea,* epilepsy, insanity, dipsomania,† etc.

Nervous system of applicant for insurance.

459. In consequence of the larger number of deaths from pulmonary affections, the *respiratory system* is carefully investigated. The existence of any tendency to pulmonary phthisis is specially inquired into. The *circulatory system, especially the heart,* is likewise carefully examined. Insurance offices attach great importance to the condition of the heart; but diseases of the valves may not altogether render a life uninsurable as will be seen later on. A weak *digestive system* is less insurable than a strong one, and, in relation to the value of a life, would carry a heavier premium with it. Weak digestion, associated with habits of intemperance, is particularly unfavourable.

Pulmonary diseases of applicant for insurance.

460. With regard to the *genito-urinary system*, a sample of the urine (passed, if possible, in the physician's presence) should be carefully examined. The following conditions

Urinary diseases of applicant for insurance.

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* *Chorea* is called also St. Vitus' Dance; it is characterised by irregular spasmodic and convulsive (involuntary) contractions of the muscles of the face and extremities.

† *Dipsomania* is an uncontrollable desire for spirituous liquors.

suggest special inquiries :—swellings of the eyelids, back of hands, dorsum or upper surface of feet, œdema or "dropsy" of scrotum* or vulva,† nocturnal micturition,‡ morning sickness§ (apart from pregnancy), lumbar pains, painful micturition, the presence in the urine of albumen, sugar, pus, or blood—also, if persistently, or in any quantity, of phosphates, uric or lithic acid, urates, of oxalates, and of bile pigments, large multiform cells|| with bright nuclei and nucleoli (the so-called "cancer cell"), epithelial and tube casts from the kidneys, and a very high or low specific gravity, with any marked increase or decrease in the quantity of urine. It is well known that albuminuria and granular or contracted kidney ("gouty kidney") are unfavourable conditions for the performance of operations, or for recovery from accidents and diseases.

Occupation of the applicant for insurance.

461. It is a matter of great importance to take the *occupation* of the applicant into consideration, even in the case of perfectly healthy lives. Some Assurance Offices will not accept the lives of male publicans, and much care is necessary in accepting any person employed in bars or in the production of alcoholic beverages. The knife-grinder of Sheffield is unassurable; they very seldom live beyond the age of 35 years.

Other condition in applicants for insurance.

462. There are many other conditions in which the occupation becomes important, and in which the judgment of the examiner must take the place of statistical tables. Especially is this so when the life is not altogether sound in personal or family history. Thus, a baker with a family history of phthisis or bronchitis would be a more risky life

* The *scrotum* is the outer or skin covering of the testicles.

† The term *pudendum* includes those parts of the female generative organs visible externally.

‡ *Nocturnal micturition* here signifies that the patient is obliged to get up at night to pass water.

§ Morning sickness in men is often a sign of dram-drinking.

|| In reality, multiformity of cells in the urine is no indication of the existence of cancer in the urinary passages, for the stratified epithelium of the lower urinary tract has almost every form of cell entering into its formation.

than a plumber or painter with the same family history, the personal histories being the same, although the occupation of painting and plumbing is on the average more dangerous to life than a baker's, for bakers are peculiarly liable to lung diseases from their exposure to sudden changes of temperature, and the dirty atmosphere in which they work. Lung weakness is, therefore, more likely to develop into actual disease in a baker than it would be in a painter, whose chief danger is lead-poisoning and gout, and in whom, conversely, a family history with kidney lesions would be more serious than the same in a baker.

463. The *family history* is of great importance in indicating any morbid tendencies of the case. It is the duty of the examiner not to accept the statements of the candidate without strict investigation of all doubtful points. For example, child-birth is frequently given as a cause of death, when further inquiry shows that death took place months after parturition (or child-birth) from a totally different cause, or that the deceased relative had had lung disease for some time before the birth of the child, and to which the relative succumbed. Again "inflammation," or some other acute lung disease, is often stated as the cause of death, when proper inquiry points to the disease being chronic and probably phthisical. On the other hand, it may be found that the candidate has given "consumption" when the cause of death was acute inflammatory disease; or "rheumatic fever," when the real cause was pyæmia. At times the candidate unwittingly makes his family or personal history tell against himself. Vague expressions should never be used in the report without interpreting them: such terms as "dropsy," "rheumatic disease," "fever," "kidney disease," are all too vague, and require elucidation as to the cause or exact nature of the maladies to which they refer.

Family history of applicant for insurance.

464. A few more special remarks are necessary with regard to urine. As we have said, it should, if possible, be

Testing the urine.

passed in the presence of the examiner to prevent fraud. There is rarely any difficulty in obtaining sufficient for the physician's purpose. In every case it should be tested for albumen, and it is safer to examine for sugar, especially in candidates passed middle life and when the specific gravity is high.

Albumen as affecting life risk.

465. To estimate the expectancy of life in *persistent albuminuria,** we can classify the cases thus:—(1) those in which traces only of albumen are observed; (2) cases in which a notable amount of albumen exists and is always present; and (3) intermittent albuminuria, in which a notable amount of albumen is found at one period of the twenty-four hours and none at another. The *first* of these groups, correctly diagnosed, does not invalidate the prospects of the case. With regard to the *second* group, the risk is invariably increased, and only those that have been under observation for a considerable time are insurable. Dr. Thomas Fraser advises the rejection of all cases in which the precipitated albumen exceeds one-eighth of the urine after it has stood for twenty-four hours. The *third* group may be regarded favourably, but requires an additional premium.

Persistent albuminuria.

466. In any case of persistent albuminuria, if the amount of urine passed daily exceeds 60 ounces, the life should be rejected.

Specific gravity of urine.

467. The specific gravity of the twenty-four hour's urine should be taken. Albuminuria is less significant when the specific gravity is high, excluding, of course, the consideration of sugar. Low specific gravity is suspicious of organic renal disease. A specific gravity of 1010 is the lowest density consistent with health.

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* *Albuminuria* is a term applied to the presence of albumen in the urine.

468. The urine must be examined microscopically in all doubtful cases: the presence of *casts** involves rejection.

Microscopic test of urine.

469. We should remember that sexual incapacity in males is an early indication of diabetes.† In females the uterus and ovaries are favourite seats of cancer ‡ and of cystic disease, respectively.

Indication of diabetes.

470. There are a few diseases requiring some special remarks in this section.

Diseases requiring special remarks.

471. This disease is generally considered as being next to phthisis in importance as regards transmitted tendency, and a family history in which cancer has caused more than one death must be regarded with suspicion, the more so when a phthisical and cancerous taint appears conjointly.

Cancer.

472. Excessive obesity demands an excess in the premium. "Sixteen people were rated up because they were too fat, and the average addition to their lives was six and a half years, and yet the experience showed that rating to be insufficient to cover the expenses from loss."—(Symes Thompson's *Gresham Lectures.*) Sieveking suggest about 25 per cent. extra rate for corpulency. The normals relations between height and weight are given in the table overleaf:—

Corpulency.

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* *Casts or tube casts* are microscopic casts of the tubules of the kidney, and are almost always indicative of kidney disease.

† *Diabetes* is the common term for the disease technically called *Diabetes Mellitus.* It is characterised by an inordinate discharge of urine containing grape sugar, accompanied by thirst, together with progressive loss of flesh and strength.

‡ *Cancer* or carcinonia is a malignant tumour characterised by the formation of a network of connective tissue containing epithelial cells. It tends to grow progressively, to eat into the parts surrounding it, to affect the constitution, and ultimately to produce death.

Life Assurance.

Relation of Height to Weight. *

Exact Stature.		Mean Weight.		Weight increased by 7 per cent.	
Ft.	in.	St	lbs.	St.	lbs.
5	1	8	8	9	2
5	2	9	0	9	9
5	3	9	7	10	2
5	4	9	13	10	9
5	5	10	2	10	12
5	6	10	5	11	1
5	7	10	8	11	4
5	8	11	1	11	12
5	9	11	8	12	5
5	10	12	1	12	13
5	11	12	6	13	4
6	0	12	10	13	8

This reads :—A man of 5 ft. 8 in. should weigh, in his clothes, 11 st. 1 lb.; but he may exceed this by 11 pounds without any material detriment to his physical condition. One-fifth too much or too little may be disregarded, but when the increased weight exceeds this, and is due to excessive fat, extra premium should be added. Corpulency is sometimes associated with gout.

This table applies to Europeans only, and is to be used with some circumspection in this country as these averages were worked out from observations made on 5,000 persons of all kinds—giants and dwarfs, and persons of ordinary size. They are fairly accurate for averages in England, for Dr. John Hutchinson reduced his cases to 2,650 in order to exclude fallacies. We are not acquainted with any averages that have been worked out in India.

* Modified from Tanner's *Index of Diseases*.

473. The nature and character of hereditary influence in phthisis must be regarded from three aspects,—(*a*) the preceding generations; (*b*) the collateral generation; (*c*) the descendants of the individual. Now the great majority of candidates for insurance have reached the age of 30, that is, after they have passed the period of life (15 to 30 years) in which most consumptives begin to show signs of the disease. And, therefore, a history of phthisis in a parent would, to a certain extent, lose weight if the individual himself was physically sound, and especially if he was born before the parent became consumptive. We must, however, beware of vague terms, as undoubtedly a large number of consumptives acquire the disease late in life, between the ages of 50 and 80; these, however, are mainly due to health having broken down from causes other than hereditary taint. Hereditary tendency to phthisis has been shown to be overrated as a rule.

Phthisis aad lung diseases.

474. The value of a phthisical tendency in descendants is even less than in preceding generations. The most important evidence in family history is that of collaterals, especially brothers and sisters, for it often indicates the critical period in which it is likely to develop, and which, if passed, places the candidate in a better position. Moreover, a phthisical taint often appears *de novo* in a family, the result of adverse influences, in the shape of invalid, aged, are alcoholic parents at the time of conception, want of nourishment, etc., etc. The following tables of Dr. Theodore Williams show that cases in which brothers and sisters only were phthisical, are 46 per cent. of all consumptives, a larger percentage than that of any other class of relations. It shows also that females are more likely to transmit the tendency than males, and that this difference between the inheritance of phthisis from fathers and mothers amounted to about 5 per cent.

Phthisical tendency in descendants.

475. Dr. Theodore Williams' analysis showed that of 484 phthisical patients, 10 had grand-parents affected, 10

Statistics of phthisical patients.

had cousins affected, 10 had both parents affected, 48 had uncles and aunts affected, 43 had fathers affected, 67 had mothers affected, 72 had father or mother affected, and 224 had brother or sister affected.

Analysis of phthisical patients.

476. Thus, phthisis in the mother gives rise to phthisis 5 per cent. oftener than phthisis in the father does; and phthisis in the brother or sister gives rise to phthisis 50 per cent. oftener than phthisis in the father.

Rules regarding lives of consumptives.

477. The following rules, extracted from Moinet's work on "Life Insurance," and which are a modification of Sir Robert Christison's rules (published in 1867), summarise the points at issue as well as it is possible to do:—

(1) One consumptive death in the immediate family of father, mother, brothers, and sisters. No positive personal objection. Fair average. No extra premium (*i.e.*, provided the proposer is some years above the age at which father or mother died young of phthisis, or is near the age of the father or mother at death, if they were advanced in years. Otherwise an extra premium).

(2) Two consumptive deaths in a numerous family, one parent especially; father above 40; one brother or sister. Personal points favourable. Age above that at which brother or sister died. Fair average. No extra premium.

(3) Two consumptive deaths among brothers or sisters; good personal history. Extra according to age, but should not be accepted unless at or above the age when they died, and personal points good.

(4) Two consumptive deaths, as both parents; good personal points. Extra according to age, and ages of parents at death.

(5) Three deaths or more from consumption, as one parent or two brother or sisters; personal points good; not to be taken unless above critical period of family, and only with heavy extra; personal points not favourable, unassurable.

(6) No deaths from phthisis in immediate family, but personal tendency to these diseases shown by bronchitis, hæmoptysis, narrow chest, general configuration. Extra premium.

(7) No death from phthisis; one from suspicious cause; infant mortality of family great; survivors very young. Extra premium.

478. Symes Thompson considers that three to five years added to the life is adequate when the personal history is good, and says that, as a rule, the rating is excessive. *Addition to life.*

479. Other adverse influences are tropical birth, a close blood relationship or great disparity of age between the parents. *Adverse influences in life insurance.*

480. With regard to the expectation of the life of the European in India the following table will be interesting— *Table of average expectation of life.*

*Abstract of Tables of Expectation of Life in India.**

A.—Of a table of expectation of life compiled by J. Westland, Esq., Beng. C. S., from the experience of the Bengal Uncovenanted Civil Service Family Pension Fund; European and Eurasian lives; period of observation, 1837 to 1862.

B.—Of a Table of expectation of life compiled by A. F. Fox, Esq., Mad. C. S., from the combined mortality statistics of the Bengal, Madras, and Bombay Civil Services; European lives only; periods of observation—Bengal, 1850 to 1872; Madras, 1790 to 1852; Bombay, 1790 to 1860; number of lives under observation—Bengal, 600 to 1200; Madras, 500; Bombay, 700.

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* LYON'S *Medical Jurisprudence for India*: "Appendix."

Note.—Table A is based wholly on Indian experience; Table B on Indian experience only up to the age of fifty.

Age.	Expectation. A.	Expectation. B.	Age.	Expectation. A.	Expectation. B.	Age.	Expectation. A.	Expectation. B.
20	...	33·65	42	17·86	22·12	62	7·93	11·39
22	31·43	32·49	44	16·69	21·18	64	7·27	10·54
24	29·85	31·41	46	15·57	20·29	66	6·62	9·52
26	28·32	30·36	48	14·53	19·39	68	5·92	8·54
28	26·84	29·31	50	13·55	18·43	70	5·20	7·62
30	25·39	28·26	52	12·63	17·38	72	4·50	6·75
32	24·02	27·22	54	11·71	16·25	74	3·80	5·95
34	22·72	26·19	56	10·72	15·09	76	3·10	5·23
36	21·49	25·16	58	9·68	13·91	78	2·41	4·57
38	20·28	24·13	60	8·72	12·74	80	1·72	3·98
40	19·07	23·10	...	...	...	...	...	...

Expectation of life reduced in India.

481. From these tables some approximation as to the extent by which the expectation of healthy Europeans is reduced by residence in India may be arrived at. The expectation shown by Table B, it will be observed, corresponds approximately to half the difference between the age and eight-six (not two-thirds of the difference between the age and eighty).

Discharge from the ear.

482. The most important ear disease for the examiner to consider is *otitis media** and its complications. Any discharge from the ear must be regarded with suspicion and carefully investigated. Under no circumstances should a candidate be accepted with acute inflammatory disease of the ear. Chronic discharge of pus is usually due to purulent catarrh of the tympanum,† an acute and painful affection of the early stages. The pus having made its way by ulceration through the tympanic membrane, may continue to discharge for years. The degree of deafness is variable,

* Inflammation of the walls or contents of the tympanic cavity of the ear.

† Or *drum-cavity* of the ear.

generally marked. It may be stated, subject to no exception, that whenever exposed bone can be detected within the cavity of the tympanum, the subject of this condition is always in a more or less perilous state.—(Sir W. B. DALBY, in QUAIN's *Dictionary of Medicine*).

483. This disease requires most careful consideration, and the experience of Life Assurance Offices shows that the usual rating up of three to five years is not sufficient. Dr. Symes Thompson points out that it would be just to add a small extra rating when well marked gout appeared as in the old days; now when people inherit and do not acquire it, as their fathers did before them, the rating must be heavier. Numbers die from diseases traceable to gout, although they do not actually die of gout itself. Gout.

484. This disease is not now regarded as a barrier to life assurance as it almost invariably was a few years ago. As Dr. Sutton says, "a heart may have much morbid alteration in its structure, and yet it may go so easy that the patient works and enjoys life for many years. What right have we in such instances to say he has diseased heart? There is no organ in the body which so completely adapts itself to a disease condition as the heart. With a pulse regular in force and rhythm and normal in tension, and where there are no symptoms indicating deficient compensation,* the risk in many cases of heart lesion may be covered by small extra premiums". It is especially important to recollect that the weakness or strength of a murmur† is no test of the gravity of the heart affection. Heart disease in insurance.

485. This disease is inherited in about 50 per cent. of the cases. It is essentially a disease of early and middle life, occurring chiefly between the ages of 15 and Rheumatism in insurance.

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* The word *compensation* (or compensatory hypertrophy) is used to signify that enlargement of the muscular substance of the heart which takes place in most cases of serious heart disease to overcome the obstruction that exists to the onward flow of the blood to the arteries.

† A *murmur* is a blowing sound, or bruit, produced by the blood flowing through defective valvular orifices in the heart.

35; after that age the individual is practically safe if he has never had it. The chief danger lies in the heart complications, which are found in about 50 per cent. of the cases, and is especially liable to occur in the young subject of rheumatism. For an attack of rheumatic fever, even with no heart complication, add five to seven years.—(SIEVEKING).

Stricture of the urethra.

486. This involves an additional premium. Broadly speaking, the younger the candidate, the higher must be the rating up, as there is a great risk of surgical kidney arising as a complication. It is a source of constant danger to life.

Enlargement of liver.

487. This complaint is due to various causes in India, chief among these being malarial influences and acute or chronic inflammation of that organ. When associated with malarial poisoning, there is frequently coincident enlargement of the spleen, and a history of recurrent attacks of intermittent fever. When due to acute inflammation, the symptoms of pain and tenderness over the spleen are connected with the hypertrophy or enlargement, and the applicant is suffering from fever. When due to chronic inflammation, there may be no symptoms or signs of disease beyond the hypertrophy itself. This latter condition is usually preceded by an acute inflammation of the liver, and the patient has frequently been intemperate in either eating or drinking or both. Enlargement of the liver from any of the above causes decreases the expectancy of life and reduces its value. In the latter class of cases the rating up should be high—from 7 to 10 years.

Enlarg ment of spleen.

488. The chief cause of *enlargement of the spleen* in India is due to repeated attacks of ague or intermittent fever or to exposure to malarial influences. The enlargement in different cases varies considerably, being sometimes barely perceptible, at others filling the entire abdominal cavity and even passing into that of the pelvis.* Any enlargement of the spleen from this cause increases

* The *pelvis* is the cavity situated below, and continuous with, that of the abdomen.

the risk, although a small, soft, enlargement may entirely disappear on removing from the malarial district, by change of climate to Europe or a long sea voyage. It is safe to reject an applicant with either enlargement of spleen or liver, and reasons for such rejection are emphasised if the candidate continues to live under the conditions that produced it, and in the district or climate in which it was engendered.

489. The foregoing is a brief summary of the principal medical points which have to be considered when proposals for an Assurance policy are made. There are, however, several legal points of considerable importance which also require to be borne in mind. Legal points.

490. The most important of these is *concealment*, and the manner in which it affects payment of the policy on the death of the person insured. Concealment may be of two kinds—(1) by the examining medical attendant, and (2) by the applicant. All Insurance Companies are in the habit of appointing their own medical examiners, and where this is not possible, as, for instance, when an application for insurance is made from a station where the Company has no special medical officer, the Company pays the medical man to whom the applicant goes for examination a prescribed fee. Thus, for the time being, the medical man—although he may have previously been the applicant's own attendant—becomes the agent of the Company. It would, therefore, be the duty of the medical man examining the applicant to state any circumstance regarding his habits or his state of health calculated to affect the risk of life which may be within his knowledge, even though such knowledge was acquired in the course of his previous attendance as the applicant's medical adviser. In the event of any material concealment of such habits or state of health, the burden of proving non-collusion would probably rest upon the claimants for the payment of the policy, since a presumption would naturally arise that a concealment had been purposely made in the interest of the applicant. Material concealment.

Medical examiners.

491. As regards specially appointed examiners, however, the case is different. It is their duty to ascertain the facts regarding which the Company require information, and a failure on their part to ask material questions could scarcely be held to make the applicant responsible for concealment. It is not to be expected that the applicant will have a medical training, and it is possible that he may be suffering from the germs of a disease which may eventually prove fatal of which he may be perfectly ignorant, but the symptoms of which the medical man, had he been more careful in his examination or more searching in his questions, might have detected; thus, in the case Fowkes *v.* The Manchester and London Assurance Company, payment was refused on the ground that at the time of the application deceased was afflicted with gout, from which disease, in a suppressed form, he subsequently died. It appeared that two years previous to his insurance, Fowkes was treated for suppressed gout. It was, however, a very 'light attack,' and the medical attendant did not even tell the patient that it was gout he was suffering from. When being examined for the insurance, Fowkes was asked whether he had been afflicted with gout and replied in the negative. The Company maintained that this was material concealment, but in putting the case to the jury the Lord Chief Justice said that the question must be considered with some reasonable latitude, and it was not because a person had some passing symptoms, which a far-seeing medical man might ascribe to the presence of suppressed gout in the system, but whether there was gout in a sensible appreciable form. The jury found that the answer was not untrue, and that applicant was not afflicted with gout at the time of the proposal.

Concealment by applicant.

492. As regards concealment by the applicant, the main point to be borne in mind is that a policy is a contract between the Insurance Company and the person insured. It is not a mere speculation, but a contract, like under-

writing, based on certain ascertained data. Now, the law will not allow in a contract that the one party should take an unfair advantage of the other; if it is proved that he has done so, the law will not insist upon the enforcement of the contract. When, therefore, a proposal for an insurance is made, the applicant should be careful to state every circumstance in his knowledge which may affect his chances of life. Taylor's remarks on this head are of importance: "The disease under which the insured laboured may have been of a trivial kind, and not likely to affect the risk, nevertheless the safest plan is to state it. The option will then lie with those who are to incur the risk." The great test in all cases of disputed payment will be the intention of the party insured, as evidenced by the truth of his answers, and not merely the truth, but the *whole* truth. There must be no suppression of truth, but at the same time a suppression of the truth will not make a policy void if the party effecting the insurance was innocent and ignorant of the suppression. This point was decided in 1856 by Lord Campbell.

493. It by no means unfrequently happens that intending insurers refer to medical men whom they have recently consulted in preference to a medical attendant of long standing, thinking that the new physician, unaware of the previous state of the applicant's health, will give such favourable replies as to his condition that he will be able to affect an insurance on his life. No greater mistake than this could be made. In such a case the person insured runs the risk of forfeiting the whole of the premiums paid and his representatives may get nothing. Such action would at once raise a presumption of material concealment, and if evidence of former illness should be available, the case would most probably be given in favour of the Company. Although an illness prior to the insurance might have had no connection with the death, still it is only right that the insurers should be made acquainted

Risk of concealment.

with it, and then they can decide whether they will accept the risk or not. The case is similar to that of a ship-owner, who, by representing that his ship was A. 1., should induce an under-writer to insure it at first class rates. If the ship were lost, and it should subsequently transpire that it was not entitled to the classification, the ship-owner would most certainly not recover the insurance.

Intemperance in insurance.

494. The question of temperance and temperate habits is a very difficult one, since opinions differ so greatly regarding what constitutes temperate habits. It has been said that drunkenness depends entirely upon a definition and that some persons maintain that no one is drunk so long as he can "lie along the floor without holding on." Others again maintain that to exceed $1\frac{1}{2}$ ounces of alcohol daily is to be intemperate, and that such excess must injuriously affect the health. Now a pint of beer contains about one ounce of alcohol, and there are very few persons who drink at all who do not regularly take double this quantity. Others again maintain that any amount of alcohol, however small, is injurious to health and that total abstinence is the one thing necessary. An interesting case is quoted by Taylor Southcomb *v*, Merriman in which payment of a policy was disputed on the ground of concealed intemperate habits. On behalf of the insured twelve persons swore that deceased was a very temperate man, whereas twenty-one witnesses on behalf of the office swore that he was habitually intemperate. In this case one of the witnesses (for the plaintiff) defined drunkenness to be "when a man lost his reason, could not give a proper answer, was not able to do business, had lost his legs and was obliged to be carried home." It was proved that deceased was in the habit of drinking enormous quantities of beer, and that he had occasional drinking bouts for two or three days together. It was, however, also proved that it was very difficult for any quantity of liquor to make him ramble, and the medical officer stated that in his opinion the drinking bouts did not affect deceased's health. Deceased died from

inflammation of the lungs, and the medical opinion was that disease was not in any way due to excessive drinking. Still, in spite of the fact of drinking having been concealed from the Company, the jury gave a verdict for the full amount claimed, but a rule for a new trial was afterwards obtained. After this it is difficult to say what constitutes intemperance. There can, however, be no doubt that in this case the facts should have been made known to the office. The real test seems to be not whether a person drinks $1\frac{1}{2}$ ounces of alcohol or twenty-four per day, but whether his drinking habits in any way affect his health. Cases have been known of men who, for half their life-time, rarely went to bed sober, but who nevertheless have lived beyond the average of life. The facts, however, should be made known and then the insurers can if they like take the risk. Here again, of course, the question of occupation will form an important point for consideration. A person of active habits is less likely to be affected by the same amount of drink as a person of sedentary habits. The words "prejudicial to health" cannot be taken as a hard and fast rule, because what may not affect one person might literally kill another.

495. "The burden of evidence falls in all such contested cases upon the office refusing payment. The office must prove the allegation on account of which it refuses payment and the proof must be clear and conclusive. It is not sufficient to prove that a particular disease or habit had *probably* existed at the time of insurance. If the disease or habits be shown to have *certainly* existed, the evidence may still fail to prove satisfactorily that the concealment was either wilful or material." (TAYLOR, Vol. II, page 626.)

Burden of evidence.

496. In the same way as intemperance forms an additional risk so also may abstinence. This is especially the case where persons who have been in the habit of full living suddenly change and adopt a course of total abstinence. Taylor mentions a case in his own experience in which "a

Abstinence in insurance.

gentleman who had been in the habit of living on a full diet, with a moderate use of alcoholic liquors, suddenly adopted the plan of living on water and vegetable food. About a year afterwards he met with a slight sprain to the ankle-joint, inflammation ensued, which, in spite of the best treatment, assumed an unhealthy character; suppuration of the joint followed; amputation of the leg was performed, but in spite of an improved diet, the powers of life never rallied." Changes of this kind should all be noted and brought to the insurer's notice.

Accidental cases of death in insurance.

497. In England, there are several offices which insure persons against accident, but this system of insurance not having as yet been introduced into this country no remarks would seem to be called for. It may merely be mentioned that great difficulty has often been felt in defining what is and what is not an *accident;* and also in settling the responsibility when death occurs from secondary causes. Death from sunstroke has been held to be *not* due to accident; death from lightning, on the other hand, would be accidental; and in the case of death six months after the deceased had fallen down stairs, where there was some conflicting medical evidence regarding the actual cause, a limited amount of money (£30 instead of £500, the amount of the policy) was held to be sufficient.

Suicide in insurance.

498. In almost all policies there is a stipulation that suicide makes the policy void. Under this head it may be mentioned that the mere verdict of a coroner's jury, that death was due to natural causes, is not sufficient to stop a Company from endeavouring to prove that death was due to suicide. Still, however, the Company, in order to gain their case, must prove conclusively that the case was one of suicide. Mere suspicion on this head is not sufficient. A leading case on this point is Kinnear *v.* The Rock Insurance Company quoted by Taylor (Vol. II, page 365 *et seq.*). In the case of an insurance effected by one person in favour of another, the principle which has been laid down is, that there must be an insurable interest. Thus, if a husband

wishes to make a provision for his wife, he will insure not her life but his own. If, however, he wished to make a provision for his children, he might insure his or her life, or even both. The reason of the adoption of this principle is, that, without it, opportunities would be given for crime, as in the case of *Wainewright,* who insured his sister-in-law's life and then poisoned her, in order, as next-of-kin, to get the sum assured. It is often very difficult to distinguish between suicide and accident, but unless the former can be conclusively proved, the Company will be held liable. An important case under this head occurred in France, where a man who had shortly before insured his life for 150,000 francs in two offices, was found dead in a railway carriage with a discharged gun between his legs and half of his skull blown off. Here the medical opinion was to the effect that death was due to suicide and not to accident, but still as the former was not conclusively proved, but only presumed, the office was held to be liable.

499. The annals of crime contain few more awful tragedies than those cases in which murders have been committed in order to recover insurance policies. The leading cases are those of *Wainewright, William Palmer,* and *Dr. Dele Pommerais* of Paris. Here it is not necessary to do more than allude to them, since they present no special features as regards insurance, and come more properly under consideration in the subject of *poisons.* It is also probable that a long time will elapse before there will exist the same facilities for perpetrating such atrocities in India as at present exist in England. There can be no doubt that if the system of insurance was more largely developed in this country, numerous cases would occur in which persons would be murdered by those who wish to succeed to the sums for which their lives were insured, and under existing circumstances the majority of such cases would be most difficult to detect.

Murder fo insurance.

CHAPTER II.

INSANITY.

Definition of insanity—Delusions—Hallucinations—Illusions—Difference between hallucinations and illusions—Lucid interval—Definition of insanity—Diagnosis of insanity—Symptoms of insanity—Other symptoms of insanity—Associations of incipient insanity—Difference between eccentricity and insanity—Errors regarding insanity—Mental unsoundness—Diagnosis of feigned insanity—Indications of feigned insanity—Importance of previous history—Difference between feigned and real insane—Insanity feigned by ignorant and common people—Insanity feigned for various reasons—Means to be adopted in detecting insanity—Conduct of insane—Causes of insanity—Moral causes of insanity—Physical causes of insanity—Prognosis of insanity—Idiocy—Insanity from sexual intercourse and other causes—Tuberculosis in insanes—Classification of mental disorders—Hypochondriasis—Mania—Commencement of mania—Features of mania—Symptoms common in mania—Mania distinguished—Delirium tremens—Meningitis—Delirium in febrile state—Melancholia—Symptoms of melancholia—Bodily health in melancholia—Religious melancholia—Dementia—The mind in dementia—Primary dementia—Demented patients—Symptoms of dementia—Diagnosis of dementia—Acute dementia—Idiocy—Manifestation of idiocy—Imbecility—Classes of imbecility—Moral imbecility—General paralysis—Symptoms of general paralysis—Puerperal mania—Insanity of pubescence—Climacteric insanity—Senile insanity—Acoholic insanity—Symptoms of alcoholic insanity—Progressive dementia—Dipsomania—Insanity due to alcohol—Gout or rheumatism—Lead poisoning—Epilepsy—Mental weakness—Insanity from sunstroke—Diseases in which insanity may appear—Phthisis pulmonalis—Worms—Blows or falls on the head—Venereal disease produces insanity—Monomania—Features of monomania.

THE subject of insanity is an extensive one, but the limits of this work permit of our dealing with the salient features only of this interesting branch of Medica Jurisprudence. In this chapter we propose to consider it from the point of view—Is the person insane? And in the following chapter we propose to consider—If the person is insane, how his responsibility is affected?

Definiticn of insanity.

500. Under the heading—Is the person insane? we shall first consider the definitions of Insanity, Lunacy, and Unsound Mind; but before proceeding any further, it would, perhaps, be advisable to define a few words and phrases used in connection with the subject of insanity, such as Delusion, Hallucination, Illusion, and Lucid interval:—

Delusions.

501. A *Delusion* is a belief in something extravagant,

which has no existence except in the perverted imagination of the patient, the ridiculousness of which he cannot recognise, and out of which he cannot be reasoned.

502. *Hallucinations* are morbid impressions made on the mind by objects external to the body, when, in reality, no objects are present. Hallucinations generally occur in long-lasting or chronic and confirmed insanity. Among such insane impressions are,—the idea of being transformed into some kind of animal, the perception of foul odours when none exist, presence of auricular delusion when no sound is audible to the sane, and of imaginary visions when no objects are present. Hallucinations.

503. *Illusions* are the improper interpretations and conceptions of things actually present and seen, *e.g.*, the morbid impression that the food is poisoned when it is not, that a voice or sound which actually exists is something else, that an individual present is some one else, and so on. Illusions.

504. The difference between hallucinations and illusions is well exemplified by stating that in hallucinations a sound heard or an object seen is purely imaginary, whilst in illusions something is really present, but it is improperly interpreted by the insane person. Both signs of insanity are generally present in the same case. These are two of the most important signs of insanity, and especially of mania and monomonia, although they may be met with in a few acute diseases. Difference between hallucinations and illusions.

505. A *Lucid interval* is an entire cessation of mental derangement for a time. The patient appears to have completely recovered his normal intellectual state. The length of time during which the lucid interval lasts varies in different cases, but it is always followed by a relapse of the symptoms of insanity and then the lucid interval again appears. This is the "recurrent mania" of Lord Coke, who defined a person in this state as "a lunatic that hath sometimes his understanding and sometimes not, *Aliquando,* Lucid interval.

gaudit lucidis intervallis, and therefore he is called *non compos mentis* so long as he hath no understanding."

Definition of insanity.

506. There is some difficulty in framing a definition of insanity that would comprehend the various forms of this state. Most definitions express either too much or too little. We would define insanity as a condition in which the intellectual faculties or moral sentiments or animal propensities—any one of them or all—have their free action destroyed by disease, either congenital or acquired, during life-time. It is a disorder of the brain affecting the integrity of the mind, and marked by mental disturbance, not being the immediate result of fever or poison—an abnormal phase of the mind of the individual, the disturbed function* being impressed by the individuality of the person affected. In general terms, it may be stated to be a morbid condition opposed to sanity, sanity being that state of the mind which enables a man to discharge his duties to his God, his neighbour, and himself. In insanity the mental faculty is deranged as expressed through the intellect, emotion, or will, but as this derangement depends upon a disorder of the brain, insanity is a bodily disease. Legally, a lunatic includes every person of unsound mind and every person afflicted with idiocy. The difference then between the medical and legal definition of insanity is that, in the medical, the existence of cerebral or mental disorder suffices, but legally it requires suspension of the mental faculties, causing the patient to be deprived of will and not responsible for his actions. If this legal definition were generally adopted, we should have very few insanes indeed. Insanity comprehends all unsoundness of mind, whereas lunacy is a legal term comprehending only those deviations from a standard soundness (which is universally recognised, although difficult of definition) in which the person, or

* This functional disturbance is frequently associated with structural changes in the brain substance.

property, or civil rights, may be interfered with, and where the insane delusions, hallucinations, or illusions threaten the safety of the lunatic himself or are sources of danger to others. Insanity is, therefore, the more comprehensive term, including all states of the mind which are inconsistent with the original and ordinary character and habits of the individual, and with his relations to his family or to the community of which he is a member.

507. Having defined the words and phrases in connection with the subject of insanity, we propose to consider the following details of the subject:—

I.—The diagnosis* of insanity.

II.—The diagnosis of feigned insanity.

III.—The causes of insanity.

IV.—The prognosis† of insanity.

V.—The classification of the varieties of insanity.

I.—The Diagnosis of Insanity.

508. In a typical case of insanity, there is usually little doubt as to the patient's state, but there are some cases of insanity which require the greatest mental acumen on the part of the physician to diagnose the patient's condition aright. As a rule, there is a premonitory stage to insanity‡ —rarely is there a leap from the sane to the insane state. The early indications of insanity are often to be detected by the physician some months before they attract the notice of the patient himself or his friends. Insanity generally comes on insidiously and when it is least expected. Diagnosis of insanity.

509. Among the early signs of insanity may be mentioned—alteration of temper, excitability, and irritability with intense loquaciousness. Sometimes there is great diffi- Symptoms of insanity.

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* The term *diagnosis* means the distinguishing, recognition, or interpretation of a disease from its symptoms.

† *Prognosis* means the prediction and foreknowledge concerning the progress and result of a disease.

‡ That is, a stage characterised by certain precursory symptoms.

culty in fixing the thoughts, or of concentrating the attention to any subject for any length of time. The insane's acts are altogether opposed to the normal state. He is disinclined for work and neglects his usual duties without apparent reason. If he does work, he suffers from confusion of mind. He takes no pleasure in pursuits that were a source of pleasure to him; he directs his thoughts to things altogether foreign to his natural temperament. He becomes conspicuously untidy in his dress and dirty in his habits. He may suffer from sleeplessness, or he rises, perhaps, and wanders about at night unable to rest peacefully. He may be unusually despondent or exhilarated, according to the form of mental disorder impending. Frequently he chooses to isolate himself. This disposition to seclusion and solitude is very often observable among the early indications of insanity. He shuns his old friends and ordinary companions, and is suspicious of those around him; he fancies that he is being perpetually watched or pursued. Delusions, hallucinations, and illusions may or may not exist in this early stage, but are ultimately almost certain to appear. His memory is defective and his language tautological. He is often tortured with blasphemous or obscene thoughts and frightful dreams. There is a weariness of life, an excessive *ennui*, and even a longing for death. He feels that he is not quite right, but does not care to consult a physician. The symptoms of this incubation period vary in intensity and in duration; sometimes they are latent, in other cases there are scarcely any important signs of insanity preceding the active stage of mental derangement. The supervention of acute symptoms without previous warnings is not common. In these instances, though no distinct mental symptoms are observable, there is usually a history of failing health and frequently of insomnia, though even these indications may be wanting. The sleep of a person on the verge of insanity is much disturbed. He is worried by dreams, and frequently wakes from his sleep with a terrified cry of alarm. Constipation, which may have continued for some time, is frequently

present. He may suffer from headache, vomiting, and sickness. A dislike is often taken to those most near and dear to him, "and the intensity of this dislike is equal to the affection he has for the same individuals previous to his illness." A father, for instance, will take a deadly antipathy to his wife and family, and this may continue for some time before those intimate with him become aware of the real state of affairs. Suicidal and homicidal tendencies may exist in the incipient stages of insanity without any marked delusions. A sudden or gradual change in a man's habits and temperament is observed, and he is often found to be exactly the opposite in every respect to what he was when well.

510. Some persons become insane suddenly during religious discourses or sermons, but in such there is always some predisposing cause to combine with this exciting one. The tortures of a wicked conscience or of a wasted life become painfully conspicuous during the incubation of insanity, and all the past becomes revealed as if in a hideous dream. As before remarked, the physician seeing the patient generally recognises the advent of the mental disorder long before the friends or relations are conscious of it. Many persons appear to dream, although awake, but they are to all intents and purposes insensible to the impressions or actions round them.

Other symptoms of insanity.

511. Associated with incipient insanity, there is often a great want of energy, and the inability to rouse from this lethargic condition is apparent both to the patient and to his friends. Slight rise of temperature is frequently found. "Those endowed with an unhealthy expansion of imagination build up a pinnacle on which their mind revels, until all consciousness of the reality which surrounds them is lost." (Forbes-Winslow). In some cases, the speech and articulation become affected and impaired. Sometimes a childishness of manner or an abnormal elation of spirits is found. The foregoing symptoms approach insidiously, and are fre-

Associations of incipient insanity.

quently not observed till the mental disorder is established. Symptoms of bodily troubles are often present. One or more of the internal organs are deranged. Hepatic mischief is often found associated with approaching brain disease.

Difference between eccentricity and insanity.

512. It is important not to confound eccentricity with insanity. Eccentricity is usually innate and not acquired, and an eccentric man is aware of the peculiarity of his actions, whereas an insane man cannot be convinced as to the absurdity of his doings. The diagnosis between those two phases is by no means an easy one, and a distinction between them is frequently required in Courts of Law. An eccentric man has been singular from birth; there is no apparent change in his behaviour or disposition; the rules of society are set at defiance by him; he has but little regard for public opinion; he can avoid his strange actions if he chooses and be like any other person. An insane man cannot do this, for in him there is an absence of that controlling power of the will which is consistent with sanity. In approaching insanity, one of the chief diagnostic symptoms is *a change in the disposition and character of the individual, accompanied by actions which in the eccentric man would not be considered strange, but in the insane would point clearly to the nature of the malady.* Capriciousness is often associated with the singularities and eccentricities of approaching madness. To obtain a correct and an early diagnosis, the only safe rule is to compare accurately the physical and mental aspects of the lunatic at the period of his supposed insanity with his prior physical and mental manifestations, which were regarded as his natural and healthy state, and which have not been observed to be different from those of other men—a comparison of the individual with his former self.

Errors regarding insanity.

513. An error which is frequently made is to consider that a person is not insane unless the insanity is evident on the surface—that there must be violence and excited actions, or even maniacal ravings to convince some persons

of the actual insanity which exists. There are so many degrees in the different varieties of insanity, that it is only by those who have had experience among insanes that these early signs of approaching mental disorder can be recognised.

514. Before the physician can judge as to the impairment of the mind in a strange individual, he ought to acquire some knowledge as to the previous condition of the feelings, habits, intelligence, and will of the person, for there is no general or universal test of mental unsoundness. Mental unsoundness.

II.—Diagnosis of Feigned Insanity.

515. It is important that we should be able to diagnose certain diseases of the nervous system, and *feigned* insanity from *real* insanity. In some cases we can make such a diagnosis only after acquiring great experience and knowledge of the peculiarities of the insane and his imitator, whereas in others an attempted deception is at once distinguishable. Diagnosis of feigned insanity.

516. The feigner of insanity has always a tendency to exaggerate his symptoms. He overacts his part, especially if he suspects that he is being watched. He will endeavour to appear worse than he can possibly be from the nature of his complaint. There will be total absence of all bodily illness. The quick and thready pulse, the furred tongue, the injection of the conjunctivæ,* the peculiar loquacity and restlessness, the haggard and worn appearance so conspicuous in real insanity, will be altogether absent. There will be a natural inclination to appear very mad in the opinion of those with whom he comes into contact. Though an attack of insanity may occur suddenly, such an onset is rare, except in cases of acute mania; whereas feigned insanity occurs without any premonitory indications to mark its commencement. We must, therefore, be Indications of feigned insanity.

* Or redness of the eye.

very careful in our diagnosis at the beginning of the seizure, from the fact that some true cases of mania do occasionally come on suddenly. The apparent irrationality of a feigner is generally of a characteristic kind. He will shout out loudly and *there will be no consistency in what he says.* Now, a lunatic, though talking in an irrational manner, will nevertheless, to a certain extent, be intelligible. Those intimately associated with him will distinguish his meaning and what he wishes to convey. The feigner, as a rule, omits the emotional features of mental disorder. He does not appear to be aware of the fact that frequently the lunatic does not conform himself outwardly differently from the sane.

Importance of previous history.

517. The history of the patient and his antecedents will also very materially assist our diagnosis. Where can we trace any cause for this sudden lunacy? Has the patient experienced any unusual worry or unnecessary excitement of late? Are there any troubles present or impending? Can any possible assignable reason be given for this outburst of madness in one who has generally been regarded as a rational being? Can any explanation be given why it should benefit him to show madness? All these queries should be attentively considered. The physical endurance required to enable a sane man to portray the violence and ravings of acute maniacal excitement, is so excessive and the exhaustion so great, that it is a moral impossibility for him to keep up this deception for any length of time. The feigner sinks from sheer muscular exhaustion and the fraud is discovered. It is impossible, under careful observation, to maintain such a fiction for any length of time. A real maniac, when excited and violent, is not apparently so affected. The shouting, struggling, and violence in his behaviour do not so affect him. He rarely feels exhausted. The *reaction following the violence of feigned lunacy must end in sleep.* The individual being unable to keep up the deception during the night is *compelled* to sleep. The real maniac continues his ravings many days and nights

consecutively, and seems to have unnatural powers of endurance, the restless nights not causing any material difference in his condition or diminution of his strength.

518. The feigner of lunacy imagines that he must naturally be violent and excited, and that these exhibitions are essential to constitute insanity. He cannot realise any other forms of insanity apart from the type of acute mania, although he frequently *mixes up various forms* in an erratic manner. The real insane conforms consistently to one variety of mental disorder. It is a curious fact that nearly every well-known instance of feigned insanity has been of this character. Acute mania is apparently easy to imitate, and is, in the eyes of the feigner, evident and convincing. He considers it to be the variety of insanity most likely to effect the purpose in view. Another point is that the exertions of the feigner induce free action of the skin: the insane patient does not perspire—his skin, as a rule, is dry and harsh from first to last, except in the warmest weather. Finally, it is important to bear in mind that an insane person will often be indignant at being considered mentally afflicted; whereas the feigner is desirous of being thought mad, and he will do all in his power to convince others that he is mad.

Difference between feigned and real insane.

519. Insanity is usually only feigned by ignorant and common people. We rarely hear of the well-educated feigning insanity. The detection of the fraud in this latter case would, in all probability, be more difficult than it is in the lower classes, or in the vulgar and uneducated people of the community. The simulation of insanity on the stage is common, but it requires a great actor and high and consummate art to properly depict true mental disorder.

Insanity feigned by ignorant and common people.

520. Insanity may be feigned for various reasons. A person convicted of a criminal offence, in order to obtain acquittal or amelioration of his sentence, may elect to feign insanity as a last resource, but such cases are rarely, if ever successful.

Insanity feigned for various reasons.

Means to be adopted in detecting insanity.

521. Let us now pass on to consider the means to be adopted in *detecting* this deception. Great caution and discrimination must be used to prevent the possibility of suspicion arising in the individual we are examining. As a rule, the true maniac is indifferent to your presence, whereas the feigner acts before you. We should sympathise with him and observe the effect. We should not appear to doubt him, but allow, and even promote, the development of his absurdities. We thus encourage him to unravel his story, without arousing his apprehension as to our intention. It may be necessary in some cases to suggest, in the patient's hearing, some severe method of treatment, such as violence or punishment. The proposition of the employment of the actual cautery has been used for this purpose. The insane has an extraordinary power of enduring pain; the imposter has not. Chloroform by inhalation, or the administration of sedatives or narcotics, can sometimes be tried with safety, and with success. Powerful sedatives have much less action on the insane than on the sane; and, in point of fact, all drugs appear to have a greatly reduced effect on the insane.

Conduct of insane.

522. The conduct and general behaviour should be assiduously watched by trustworthy and skilled attendants (where these are available), during the day and also at night. This should be done regularly and systematically, and relays of attendants should be employed for the purpose. If the patient does not exhibit symptoms of the ordinary maniacal type, and there is absence of violence, we should endeavour, in conversation, to throw him off his guard and form our opinion from a comparison with cases of real lunacy of a similar description. An insane person will often try to hide his delusive ideas, whereas a shammer will force them upon us. One of our most important proofs is the absence of any motive for the assumption of a complaint which is regarded with feelings of horror and dismay by humanity in general.

III.—Causes of Insanity.

523. The causes of insanity may be considered under the headings of *Moral* and *Physical*. Causes of insanity.

524. The *moral causes* may be enumerated as follows :—Domestic trouble and grief, including loss of relations and friends (4·4) ;* adverse circumstances, especially pecuniary difficulties (7·3) ; mental anxiety, over work, and business worry (6·4) ; religious excitement and anxiety ; disappointment in love affairs, including seduction ; fright, fear and nervous shock ; vice and immorality ; wounded feelings, political and other excitement. Moral causes of insanity.

525. The chief *physical causes are* :—Intemperance in alcoholic liquors (18·2) ; previous attacks (14·6) ;† other bodily disturbances (10·9) ; accidents and injuries (5·3) ; venereal diseases ; self-abuse ; sunstroke ; tropical climate ; uterine diseases, including menstrual disturbances, lactation, diseases of the ovaries ; affections of the spine and head ; epilepsy ; fever and febrile diseases ; certain congenital imperfections in development ; puberty ; senility ; climacteric age ; privation and starvation. In about 23 *per cent.* of cases no cause is assignable. In a large number of cases we find a well-marked predisposition to insanity, which is brought out under the influence of an exciting cause. The above groups embrace the main causes of insanity. In the majority of cases only one cause is in operation in producing the mental disorder ; in others two or more causes combine. Physical causes of insanity.

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* The figures within the brackets indicate the *percentage* of cases of insanity from the cause specified as ascertained from 14,308 cases. For these figures, and for much of the information contained in the section on *Insanity*, we are indebted to Professor Welch, Brigade-Surgeon, Army Medical School, Netley.

† Showing the ratio of tendency to recur.

IV.—Prognosis of Insanity.

Prognosis of insanity.

526. Regarding the prognosis of insanity, we can only offer some general remarks.

Idiocy.

527. *Idiocy* is incurable, although such mental powers as the patient possesses may, by careful training, be improved to some extent. It does not necessarily shorten life, yet, owing to various causes, which we need not here relate, idiots die young. *General paralysis of the insane* is also practically incurable, although in a few rare cases patients recover, and in some instances the disease is not progressive. The victims of this disease usually die in a few years from its first manifestation and a large number die within the first year. *Dementia* from old age, or organic disease of the brain is, as a rule, incurable. Cases due to syphilitic disease of the brain frequently get well—for a short time, at any rate—under suitable treatment. The dementia consecutive to chronic melancholia, mania, and monomania, is incurable. Demented patients, however, often live for years in fair bodily health, with little deterioration of their mental condition. *Primary dementia*, arising from moral shock or from acute bodily disease, is much more hopeful, as is also the partial dementia following puerperal insanity or consecutive to mania or febrile states. These cases, as a rule, recover. Of the three important varieties of insanity—melancholia, mania, and monomania,—mania is the most prone to be followed by recovery, monomania the least. "At the same time, there are considerations which modify, in certain cases, the general applicability of this rule; for example, insanity of sudden onset is usually more curable than that which has come on insiduously; insanity which has already lasted for some time with no improvement is less hopeful than insanity of recent occurrence; cases in which mania and melancholia alternate and cases of recurrent insanity are especially gloomy as to their ultimate prospects of recovery." (Bristowe). *Melancholia* with fixed delusion, such as those in which the patient is the victim of some external agency,

or in which, under some such mental influence, he has homicidal tendencies, is of specially grave omen. Insanity with hereditary predisposition to mental derangement, is less favourable as to prognosis than in insanity, where no family taint is traceable.

528. In the case of insanity brought on by sexual excesses, and particularly by self-abuse (especially if under these circumstances the mental disorders are associated with epileptic fits), the chances of recovery are very meagre. Insanity in young persons, or in those suffering from some curable bodily disease, or developed in hysterical or puerperal* females, is, to a large extent, remediable. The prospects of life, in all conditions of mental aberration, are largely affected by the state of the general health associated with the mental disorder. Insanity from sexual intercourse and other causes.

529. *Tuberculosis*† is exceedingly common, and when it occurs it is in the insane very fatal. Intercurrent systemic diseases attack the insane more frequently, and with greater severity, than those who are of sound mind; and such diseases in the insane frequently terminate in death. Insanes are exposed to many accidental, suicidal, or other causes of death. In cases of acute insanity, patients frequently die from simple exhaustion. Tuberculosis in insanes.

V.—Classification of the varieties of Insanity.

530. Before entering upon a description of the different varieties of insanity it will be advisable to classify the several forms of mental disorder. The classification of the different varieties of insanity has been the subject of much Classification of mental disorders.

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* Pertaining to the condition of a woman in childbed.

† *Tuberculosis* is the infectious disease commonly called "consumption" or phthisis when the lungs are the seat of small deposits, called tubercular deposits. The tubercles are due to the effects produced by a specific bacillus and characterised by the formation of tubercles in various parts of the body.

discussion. We shall, however, here adopt that of the Royal College of Physicians of London, which is as follows :—

Mental disorder, Insanity, Lunacy.	A. Based on symptoms, idiopathic, clinical diagnosis.		Hypochondriasis, Mania, Melancholia, Dementia (including acquired imbecility), Idiocy, Congenital, Imbecility, General paralysis of the insane.
	B. Based on precursory bodily states, secondary, sequential, consecutive diagnosis.	Periods of Life	Puerperal Insanity, Insanity of Pubescence, Climacteric Insanity, Senile Insanity.
		2. External causes, general or local.	Toxic Insanity, Alcoholic Insanity, Insanity from Lead, Gout, Rheumatism.
		3. Internal causes, cerebral.	Consecutive Insanity, Epileptic Insanity, Insanity associated with obvious morbid change or changes in the brain.

Hypochondriasis.

531. *Hypochondriasis* is a form of melancholia in which there is considerable mental despondency, but not neces-

sarily associated with delusions, or marked lessening of the reasoning powers. It is characterised by a feeling of profound illness, an inclination to exaggerate the symptoms present, and to brood over them.

532. These patients usually suffer from pain, discomfort, or actual illness, and it is in relation to this that their feelings of extreme misery and their dismal forebodings arise. They are perpetually thinking of their imaginary or real sickness; they scrutinise and ponder over each new symptom as it appears. They are constantly on the *qui vive* for fresh signs of disease. They repeatedly look at the tongue or feel the pulse, and with the least possible grounds for their conclusion, they delude themselves into the belief that they are the victims of certain serious internal disorders, which must inevitably prove fatal or cause them to lead a life of constant anguish and wretchedness. They formulate the most absurd explanations as to the grouping of their symptoms, *e.g.*, they may state that all their troubles arise from the abdominal cavity containing snakes or other reptiles, or from the same cavity being unprovided with liver, spleen, stomach, or bowels. They are constantly perusing medical works (if such works are available and they can read), pondering over what they read, and applying each symptom read of to themselves. All their conversation, and especially that with the physician, is a monotonous repetition of their imaginary or exaggerated bodily sufferings. As a rule, they have an air of sadness and misery. They are often quarrelsome, and peculiarly selfish, taking little or no interest in any thing outside themselves. They neglect their duties, and are weak and wavering of purpose. If able to afford it, they are as constantly changing their physician as they are the description and nature of the diseases from which they declare themselves to be the constant sufferers. Occasionally, insane delusions arise, chiefly in connection with the prevailing feelings of illness. At this stage the patient becomes insane beyond all doubt. Frequently they

can reason accurately on all topics except that of their illness. This disease is, as a rule, easy of diagnosis. It is most commonly met with in the middle-aged and those advanced in years. It is often associated with real bodily disease, and this fact should cause the physician to carefully investigate the patient's bodily condition in all such cases. Under proper treatment, recovery is by no means uncommon.

Mania.

533. *Mania* or "raving madness" may be defined as a derangement of the mental faculties attended with sudden outbursts of ungovernable fury and general delirium, or more briefly, it is a *disorder of the intellect with excitement.* It is specially characterised by intellectual vivacity and incoherence, sentimental exaltation, and excited muscular action. The reasoning faculties are lost, disturbed, or confused. The ideas are abundant but they wander. He is violent, excited, and mischievous. The expression of the countenance is peculiar; and when once seen, will ever be remembered. The patient is sleepless, and may keep talking day and night continuously for a week or more. The prolonged sleeplessness and physical exertion, without apparent exhaustion, distinguish *feigned* from *real* mania. The maniac cannot maintain a conversation on one topic; he wanders from one subject to another with great rapidity.

Commencement of mania.

534. As a rule, the commencement of the attack is insidious, and when this is the case, the disease is preceded by unusual depression. He then becomes increasingly restless, strays about from place to place in the hope of getting relief from his strange feelings and his discomfort. He his dissatisfied with his condition and knows that he is not quite in his normal state. It is this stage that he more or less suddenly bursts out into the maniacal condition, and in which the diagnosis can no longer be a matter of doubt.

Features of mania.

535. As we have already remarked, the strangest features of mania are the disturbance of the affective functions

which it presents, and the impulse to incessant activity which accompanies this disturbance. The general tendency is to an exaltation, both mental and physical. These states are constantly varying in character and intensity; he is sad, ill-tempered, angry, ferocious, boisterous, haughty, arrogant, proud, vain, gay, humorous, loquacious, lascivious, etc., according to the idea predominating at the moment. He may be boisterous, dangerous, suicidal, or homicidal at one moment, and frivolous or harmless at the next. He may curse, swear, or use obscene language; he may be aggressive and destructive; or he may assume the attitude of a penitent sinner. Some patients collect and accumulate all kinds of filth and rubbish in one corner, at one time consuming it, at another scattering it over the room. Others may display libidinous tendencies by masturbating openly and shamelessly.

536. Illusions, delusions and hallucinations are all common in mania, and their presence considerably affects the character of the patient's ideas and directs his actions and language. The hallucinations and delusions are, however, like his thoughts and inclinations, various and fleeting; they do not revert themselves, and in this manner bring into strong contrast the *fixed* delusions and hallucinations of melancholia and monomania. Symptoms common in mania.

537. There are a few bodily diseases and states from which it is necessary to distinguish mania, such as Delirium Tremens, Meningitis,* and Febrile Delirium. Mania distinguished.

538. In *delirium tremens* there is a peculiar nervous tremor not found in mania. In the former the delusions and hallucinations are of a painful nature. The patient is under the impression that he is surrounded by some horrid animals, insects, or reptiles, such as wolves, tigers, rats, scorpions, snakes, etc., or that he is pursued by fiends, goblins, or by his own friends. He has a "busy delirium." Delirium tremens.

* Or inflammation of the membranes of the brain.

He may manifest anxiety to do something in connection with his daily occupation. We notice a lowered bodily state indicated by a soft, weakened pulse; his skin is cool and clammy, and the tongue coated with a white fur and tremulous. As a rule, in a few days the patient recovers from his morbid state.

Meningitis.

539. In *Meningitis* the restlessness and violence are only manifest for a limited period. The maniac will walk up and down his room for hours and even days together. In meningitis there is fever, the pulse is full and bounding (in the early stage at least), the eyes are bloodshot, the pupils contracted and unaffected by light, and the skin is hot and dry. There are attacks of headache, shivering fits, or even convulsions.

Delirium in febrile state.

540. In the *delirium* sometimes associated with the *febrile state,* there is a history of some particular form of fever. The delirium is low and muttering, and the fits of excitement are only temporary, and frequently the patient can be aroused to consciousness by asking him to explain his sensations.

Melancholia.

541. *Melancholia* is a disorder of the intellect with depression, frequently associated with a suicidal tendency. The patient's state conforms to the popular meaning of the word *melancholy,* but to a morbid degree. He has a sad expression, and his feelings and emotions are depressed. He suffers from a constant dread of some impending or existing calamity. The mind is full of mournful forebodings. He finds fresh sources of pain and causes for despondency in everything that surrounds him. There is an unwillingness to move, talk, or to eat his food, which latter he refuses. This is *simple* melancholia, but even in this simple form of the disease there is a morbid state of the mind,—the patient has false perceptions and hallucinations, and there is exaggeration of ideas or the reverse. Melancholics will often make the most extraordinary plans

to commit suicide, and will often plot for days or weeks to effect this end.

542. There is every degree of the disease from acute to chronic. In all cases, sadness, despair, despondency, or reproach are depicted in every feature. The eyes are downcast and fixed; he seeks solitude and evades recognition. He broods over his woes and refuses to be consoled. He is constantly absorbed or engrossed in a passive despair. He is either taciturn and laconic, or pours forth the tale of his imaginary sorrows. These various manifestations of the disease may alternate. The sleeplessness is curious, in that the patient retires to bed, but covers up his head and remains awake, deluding himself into seclusion. The attendant (if there is one) will tell the visiting physician that the patient slept well. Symptoms of melancholia.

543. The bodily health likewise suffers. The digestive system gets out of order; he loses flesh, becomes anæmic,* and general debility sets in. Bodily health in melancholia.

544. A religious element is often met with in this disease (*religious melancholia*). In melancholia, as in mania, the intellect is in full force, the imagination conjuring up all forms and feelings. The acute form of melancholia may have a superficial resemblance to mania, especially if the patient is exclamatory as to his woes. The more chronic formsof melancholia merge into dementia. Religious melancholia.

545. *Dementia* is a disorder of the intellect characterised by loss or feebleness of mental faculties, induced by old age, or consecutive to some other form of insanity. In melancholia, there is activity of thought and feeling, undue excitement or depression in the emotions. In dementia there is torpor of intellect, emotion and will. The mind is altogether weak, the ideas are confused, vague and wander- Dementia.

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* *Anæmia* is a morbid state associated with alteration in the quality of the blood, and in particular with a decrease of the number of red blood cells.

ing, and the memory is impaired. The patient is ignorant of time, place, quantity, quality, property, etc. Formerly the term *dementia* was limited to that condition as met with in adult life. It is now made to include *acquired* (as distinguished from *congenital*) imbecility.

The mind in dementia.

546. In dementia there was at some former period of life, a normal condition of the mind which has been lost, and this fact distinguishes this disease from *idiocy* and (congenital) imbecility, in which diseases there never has been any intelligence.

Primary dementia.

547. Dementia usually follows some other form of insanity, that is, it is, as a rule, secondary or consecutive. Primary dementia is very rare, and is usually the result of some strong impression such as the sudden loss of a dear relative, or of property.

Demented patients.

548. Demented patients are undecided, childish, and silly. They have neither affections nor aversions. They forget in a moment what they have heard. When in repose the features are normal, placid, and emotionless, and do not depict the characters of the disease as they do in mania and melancholia; but on interrogating the patient, we at once recognise the absence of all expression of thought and feeling.

Symptoms of dementia.

549. The patient neglects his person and his dress, not from any emotion, but from apathy and indifference. He is child-like. His perceptive faculties have gone. He may have hallucinations and delusions but they are usually silly and ridiculous. His talk is like "baby babble," his actions are absurd. He avoids exertion; his vocabulary is meagre; he remains silent from absence of ideas; his eye is devoid of expression. He is dirty in his habits, and is given to self-abuse. He has frequently a ravenous appetite. As a rule, his condition becomes progressively worse. There is, however, every grade—from a few simple delusions and some want of physical energy, to complete loss of the mental capabilities, and inability to walk.

550. The *diagnosis* of a typical case is easy : there is absence of mental faculties, with the history of a previous sound mind and body. The *prognosis* varies with the cause. Some cases recover, others deteriorate progressively. Recovery is common in dementia consecutive to fevers—that is, in dementia, preceded by mania (the mania resulting from some febrile state), the prospects of recovery are very good. Diagnosis of dementia.

551. In the young dementia is sometimes *acute*, from sudden shock, fright, anxiety, etc. In such cases the patient lies in bed, takes no notice of his surroundings, refuses his food, and passes his excretions under him. The mental faculties are in complete abeyance. The prognosis is good in these cases. Acute dementia.

552. *Idiocy* is a congenital affection in which the intellectual faculties have never been manifest, or have never been developed sufficiently to enable the unfortunate patient to acquire such an amount of knowledge as persons of his age under similar circumstances are capable of receiving. In it the original mental development has fallen far short of the normal standard, either from a congenital cause, or one occurring in early childhood. The low state of development of the brain is usually associated with alteration in the form of the head, and often with a generally misshapen body. The head is, as a rule, small, the forehead very oblique and the crown flattened. Deafness and squinting are frequently associated with this disease. Idiocy.

553. In the idiot, the manifestations of his condition began at an age which preceded the development of the intellectual faculties, and they for the most part are from the first what they are doomed to remain throughout the idiot's existence. In a fully developed case, there is little memory, and less judgment, although he is usually cunning, dirty, and often mischievous in his habits. In the less marked cases, there is a certain amount of intelligence and reasoning power. By education he may learn how to Manifestations of idiocy.

express his wishes by signs, but his articulating power always remains imperfect. The acts of the idiot are usually the results of impulses originating in the sensations.

554. One class of cases, sometimes called the "apathetic," frequently have awkward, clumsy, ill-shaped bodies, coarse features, thick and everted lips, irregular and decayed teeth, and ill-formed, large ears. In these cases the head is often large. Mentally, they are gloomy, apathetic, but sometimes passionate and dangerous. Another variety of idiots, called the "agitated" (Dr. Ireland) are quick and flighty, run about crying, laughing, and gesticulating. These are subject to outbursts of passion, and they are often aggressive. They have usually small, well-formed heads.

Imbecility.

555. *Imbecility* is a variety of idiocy which manifests itself in infancy, and in which the mental faculties from childhood upwards remain in an undeveloped state. It may therefore be considered a minor form of idiocy, and, in point of fact, in some cases it is extremely difficult to distinguish between the two conditions. The difference becomes more manifest under the influence of education, for the idiot is with difficulty taught anything, whereas the imbecile can usually be educated to a low standard. The fact remains, however, that the two diseases run the one into the other, the worst forms of imbecility passing imperceptibly into the less marked cases of idiocy. One authority (Guy) goes so far as to state that the main distinguishing feature between the two diseases is, that imbeciles possess the power of speech, whereas idiots do not. The idiot, as a rule, is more misshapen in body, and in general he is less developed than the imbecile. Most imbeciles are both intellectually and morally deficient. They have a limited power of acquiring or retaining knowledge. They cannot understand or appreciate the value and uses of the customs of society or of human and Divine laws. They cannot control their emotions and passions. But there is a small excep-

tional class which exhibit intellectual deficiency, without seriously offending against morality, and a larger one which combines the highest intellectual endowments with utter incapacity in the conduct of life.

Classes of imbecility.

556. "There is therefore an intellectual, a moral, and a general imbecility, as there is an intellectual, moral, and general mania." The form of imbecility which is most common, and most important from a medico-legal point of view, is that which affects the intellect, the morals, and the prudential conduct of life. Persons who exhibit this deficiency, profit by education, so as to form, and express, simple ideas, read, write, and count, and to become musicians, draughtsmen, or mechanics. They even attain proficiency in some one accomplishment, but they do not profit by the opportunities afforded thereby. In the same disease some patients are fickle and incapable of concentrating their attention, others methodical and persevering; some are fit only for the coarsest and rudest labours, while others, when daily assisted and guided, are equal to the conduct of business and management of property, for they know the value of money and can give information on matters with which they are conversant but are unequal to emergencies and unable to sustain close conversation. They are thoughtless, imprudent, uneasy, wandering about, and generally incapable of strong and steady attention. Among the lower orders of society there are some who are worked upon by their neighbours as weak and singular persons, and these unfortunates are teased and tormented accordingly. Some acquire lazy, drunken, and dissipated habits, and addict themselves to begging. Some, under the slightest provocation, and for very inadequate motives, break out into fits of ungovernable passion and commit acts of wanton mischief, such as arson, rape, or murder.

Moral imbecility.

557. The moral imbecile remains at large, because the intellect being unaffected they have no distinct delusion; and as weakness of intellect is a necessary factor in the egal idea of imbecility, the attempt to prove that such a

person is of unsound mind in a court of law necessarily fails. That absence of moral sense and want of moral control which are the chief indications of their mental disorder, can be proved only by the history of his daily life—a history often hard to obtain and frequently studiously withheld.

General paralysis.

558. *General Paralysis of the Insane* is a disorder of the mind associated with progressive loss of muscular power. It is probably due to a hardening of the grey matter on the surface of the brain, combined with thickening and adhesion of the membranes. This disease rarely lasts more than three years. It may be a sequel to some other form of insanity, especially mania, or come on as a primary disease. There is a general or progressive loss of muscular power and co-ordination, with delusions and altered ideas, tending to pass into dementia.

Symptoms of general paralysis.

559. The muscles are fairly good in volume. There are tremors, loss of co-ordination first manifesting itself in the face, tongue, and lips—particularly in the "syllabic" mode of expression. The patient trips in his speech from inability to cause the muscles of articulation to act properly. The lips and tongue tremble when in use, the tongue cannot be protruded, and he is unable to turn up the tip of the tongue. Deglutition is difficult and the saliva dribbles down the chin. The eyelids tremble when closed. There is tremor of the limbs when they are moved. All actions requiring muscular co-ordination are difficult, especially those requiring delicacy of movement. The gait is uncertain. The functions of the body are carried out imperfectly: the circulation is sluggish; and the sensibility of the surface is impaired. Reflex actions of the legs, from tickling the soles of the feet, has disappeared. The face has a very calm appearance from paralysis of muscles of expression; the angles of the mouth drop. The excretions escape involuntarily, either from want of attention to the offices of nature or from paralysis of the sphincters. Even-

tually the patient cannot utter a word. He is constantly grinding his teeth. At this stage all voluntary motion is abolished—the patient lies like a helpless mass of flesh,—motionless and insensible, a torpid existence is reduced to a slow death. Even in the earliest stage of this disease there is some mental alienation. Delusions related to wealth or exaltation of physical strength predominate.

560. *Puerperal mania* is a form of insanity that usually assumes the maniacal type. It begins, as a rule, immediately after parturition, and is accompanied by violent delirium and often by hallucinations. Frequently, a feeling of hatred towards the husband exists, associated with a desire to destroy the recently-born babe. These cases are generally curable, but where there is a hereditary tendency to insanity, an attack of mania coming on at the period of confinement should be regarded with apprehension, for it frequently becomes chronic. The patient is sleepless, excitable, and has other symptoms connected with ordinary mania. Puerperal mania.

561. *Insanity of pubescence* is occasionally met with. It is a condition important to recognise early in its true character. Much injury is frequently done by the patient being at first considered a culprit, and dealt with accordingly, instead of receiving that careful and judicious management necessary to the treatment of the disease. This variety of insanity is marked by great disturbance, emotional and moral, which is evinced by restless, though seldom violent, excitement, ungovernable sexual desire, acts of wanton mischief, and manifestations of unreasonable vanity. Any great alteration of the natural disposition during this period of life, ought to be regarded as probably morbid in its tendencies and should be carefully watched. Constant sleeplessness at this time should lead to apprehension regarding the functions of the mind. The physical condition is indicated by fitful appetite, general debility, and anæmia. If the hereditary tendency is not exceptionally Insanity of pubescence.

strong, or aggravated by accidental causes, the prognosis is not unfavourable.

Climacteric insanity.

562. *Climateric insanity* occurs in the male sex between the ages of 50 and 60, and in the female, between 40 and 50. It generally assumes the form of melancholia. It is gradual in its onset, showing itself in sleeplessness, a dread of some impending (although imaginary) disaster, in religious despondency, hallucinations of the senses, refusal of food, and frequently there is a suicidal tendency. Should excitement and exaltation occur, they are of short duration. This form of insanity is usually associated with great emaciation and anæmia. In the majority of cases, the prognosis is unfavourable, and when recovery does not take place within one or at most two years, the case ends in dementia.

Senile insanity.

563. *Senile insanity* is a form of dementia, which comes on gradually in persons who have passed through the earlier periods of life without any signs of mental aberration but who break down in old age. Its chief characteristic features are,—loss of memory, fits of slight excitement, and whimsical sentiments. He is quarrelsome and argumentative, but there is a gradual accession of a decided dementia. Occasionally ; there are remissions, which are sometimes very short, but at others so prolonged, as to amount practically to recovery. Sometimes the nervous system breaks down rapidly, in which case there is usually a marked likeness in the symptoms to those of general paralysis of the insane. In both, the mental and physical conditions in the advanced stages are alike, and at times almost indistinguishable. The diagnosis will depend chiefly upon whether the pathognomonic first stage of general paralysis has been observed at the commencement. The sufferer from general paralysis of the insane rarely lives to an advanced age.

Alcoholic insanity.

564. *Alcoholic insanity* is the commonest form of insanity due to alcohol and is that transitory mania known as *deli-*

rium tremens. But there are other forms of mental disorder due to alcohol.

565. Habits of intoxication, along with the ordinary symptoms of chronic alcoholism, often induce a state of the mind characterised by gloomy suspicions and hallucinations of hearing, and this condition has prompted to homicide as well as to suicide in a number of cases. The excess in alcohol may cause mania or melancholia of an ordinary kind, except that the delusions partake of the *delirium tremens* character, and that the attacks themselves are of shorter duration. This form is rare. Symptoms of alcoholic insanity.

566. *Progressive dementia* accompanied by a form of general paralysis, is rather a common result of prolonged drunken habits. It not unfrequently occurs in women who have been long addicted to secret "tippling." The symptoms closely resemble those of ordinary general paralysis, and in some cases the two disorders can scarcely be distinguished from each other. Progressive dementia.

567. *Dipsomania** may be considered in connection with the subject of alcoholic insanity. It is not legally recognised as a form of lunacy, the victims of its dire influence being regarded in the eye of the law as responsible individuals. Dipsomania may be described as a morbid propensity to consume alcoholic liquors in excess. The abnormal craving is only satisfied by the imbition of larger and larger quantities. The person so afflicted cannot resist imbibing to excess, and for the time being is, to all outward appearances, mad. Nevertheless he is not regarded as such by our legal authorities, for it is laid down by law that drink aggravates the offence. Cunning, falsehood, deceit, depraved morality, and hypocrisy, are the concomitant symptoms of this craving for stimulants. Dipsomania.

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* *Dipsomania* is sometimes called *chronic alcoholism*.

Insanity due to alcohol.

568. That a certain *percentage** of cases of insanity is due to excesses in alcoholic liquors is now a universally recognised fact. The Commissioners in Lunacy, whose opinion is founded upon the broadest basis of observation, attribute about 14 *per cent.* of cases to cause.

Gout or rheumatism.

569. The poison of *Gout* or of *Rheumatism* circulating in the system may bring on mental derangement amounting to insanity. Such attacks of insanity are frequently metastatic in character, the joint affection being in abeyance during the continuance of the *mania,* which is the usual form the mental disorder takes. As a rule, insanity from this cause passes away in three weeks.

Lead poisoning.

570. *Lead poisoning* may produce maniacal excitement, or it may end in dementia. The same poison may produce all the symptoms met with in general paralysis of the insane, and it is almost certain that it is a possible cause of the origin of that disease. It may likewise give rise to epilepsy and its results.

Epilepsy.

571. *Epilepsy* and insanity are allied by origin—epilepsy occurs in neurotic subjects, and when it occurs in infants, it may cause idiocy or imbecility. Frequent recurrence of epileptic fits, whether in the mild or severe form, leads to weakmindedness. Hallucinatious of the senses may precede the fits, and a period of unconsciousness may follow each convulsive attack. During this period highly complex acts are sometimes performed, the patient being in a condition allied to somnambulism or mesmerism. Epileptic fits may be followed by fury of the most violent kind, during which brutal and bloody deeds may be done. Simple *convulsions* may be replaced by mental disorder. In this case, the patient, after performing a certain amount of any work he has in hand, suddenly goes through more or less highly organised acts unconsciously. These acts in each recur-

* The exact proportion is not satisfactorily ascertained in consequence of the complication arising from the study of the direct, as well as the indirect, effects of this poison.

rence are exactly alike, and just as each epileptic fit is a repetition of its predecessor, so is each mental attack like its forerunner.

572. After *fevers,* it is not uncommon to meet with some degree of mental weakness, the degree of which does not depend much upon the severity of the fever, and this is especially the case after typhoid fever. This mental disorder may range from simple loss of memory to loss of control and excitement with emotional disturbance. In highly nervous people the delirium of any fever may set up mental disorder, which may assume the form of acute delirious mania or, more commonly, simple acute mania. Mental weakness.

573. If distinct insanity is produced by *sunstroke,* mania followed by dementia is the form assumed: the prognosis in these cases is generally unfavourable. But this is not to be confounded with a condition of mental irritability of no great severity, and accompanied by hallucinations of hearing and sight, which occasionally arise suddenly in the advanced stages of some fevers and especially in pneumonia; for this latter form of mental aberration is temporary, passing away in a few days or earlier. Such cases are really forms of acute delirium, symptomatic of the associated disease. Insanity from sunstroke.

574. The foregoing account includes all those special varieties of insanity recognised in the *Nomenclature of Diseases.* There are many other diseases, however, in the course of which insanity may appear. The chief of these are :— Diseases in which insanity may appear.

575. *Phthisis pulmonalis,* or pulmonary consumption, during the last stages of which insanity occasionally arises. The symptoms are usually very acute, and often simulate delirious mania. Phthisis pulmonalis.

576. *"Worms" in the bowels* may produce mania through the action of peripheral irritation on the brain, just as they occasionally give rise to epilepsy or convulsions. Worms.

Blows or falls on the head.

577. *Blows or falls on the head* are not unfrequently followed by insanity. The form varies. Mania or dementia may be met with, as may also a combination of the two. The prognosis depends upon the amount of injury sustained by the brain.

Venereal disease produces insanity.

578. Although we have alluded specifically to some diseases as precursors of insanity, there are various other morbid bodily states that may be followed by mental derangement—cardiac, intestinal, hepatic, renal, vesical, uterine, and ovarian diseases especially. We should remember that venereal diseases occasionally produce mental derangement, amounting to insanity.

Monomania.

579. There is one form of insanity to which we have not as yet referred, but which finds a place in all works dealing with the varieties of insanity—we allude to monomania. *Monomania,* or partial insanity, is that form of mental disorder in which the understanding is deranged to a certain degree, or is under the influence of one particular delusion. The conduct and manner is in accordance with the predominating delusion. "A false principle is seized upon, which is pursued logically, and from which legitimate consequences are deduced": for example, he may consider that he is made of glass and avoids all rough handling. Apart from his delusion, he will speak and act like sane persons, so that his insanity is often difficult to detect, and may show no *obvious* sign of mental disease.

Features of monomania.

580. Monomania is characterised by the existence of one particular idea, which rules all the actions of the individual. "The monomaniac lives outside himself," and differs from others in the excess of his emotions. The physiognomy of a monomaniac is usually pleasant and cheerful. The eyes are brilliant. He is either gay or petulant, or rash and boisterous.

CHAPTER III.

INSANITY AS AFFECTING RESPONSIBILITY.

Definition of insanity—Insanity and unsound mind—Unsoundness of mind as regards accused—Criminal responsibility of insanes—Criminal responsibility of insanes—Unsoundness of mind must be complete—Direction of jury—Drunkenness—Unsoundness of mind when called upon to plead—Deaf and dumb treated as persons of unsound mind—Prisoner's intelligence—Indian law requires amendment—Insanity as affecting a witness—Deaf-mutes as witnesses—Testamentary capacity—Test of capacity to make a will—Will valid if mind unimpaired—Insanity as affecting civil rights and liberty—Restraint of lunatics—Law on commitment of insanes to lunatic asylums.

IN the foregoing chapters we have shown what insanity is from a medical point of view: we have now to consider the subject in its legal aspect.

581. Section 84 of the Penal Code lays down that "nothing is an offence which is done by a person who, at the time of doing it, by reason of unsoundness of mind, is incapable of knowing the nature of the act, or that he is doing what is wrong or contrary to law." It will therefore be seen that mere insanity, as explained in the previous chapter, will not free a man from responsibility for acts committed. What he must prove in order to be held not liable to punishment is *unsoundness of mind.* Definition of insanity.

582. There are many phases of insanity in which a person cannot be said to be so unsound of mind as not be able to distinguish between right and wrong. This is the case as regards a large number of monomaniacs, and of persons suffering under illusions and delusions. For instance, there was an officer in the Madras Presidency some fifteen years ago, who occasionally used to be subject to most peculiar delusions. On one occasion he was possessed of the idea that he was a tea-pot, and used to go about with one arm placed a-kimbo, saying to his friends 'pour me out.' In other respects he was perfectly sane and could transact his daily work. Now, if such a person were to commit a crime— Insanity and unsound mind.

say, murder—the mere fact of his suffering from monomania of the kind described would not be held as excusing him from responsibility. His unsoundness of mind must be of such a nature as to render him incapable of recognizing or appreciating the nature of his acts.

Unsoundness of mind as regards accused.

583. There are two ways in which unsoundness of mind relieves an accused person from responsibility—(1) being unsound of mind when the act was committed, and (2) being unsound of mind when called upon to answer to the charge in Court. As regards the first point we cannot do better than introduce the remarks of Surgeon-Major LYON, C.I.E., (*Medical Jurisprudence*, 1890).

Criminal responsibility of insanes.

584. These answers are also embodied in Section 84 of the Indian Penal Code, which constitutes the law of India on the subject of the criminal responsibility of insanes. This section is as follows: "Nothing is an offence which is done by a person who, at the time of doing it, by reason of unsoundness of mind, is incapable of knowing the nature of the act, or that he is doing what is either wrong or contrary to law." The effect of this section may be stated to be as follows: Suppose it to be proved that an individual has done an act which, were he sane, would be an offence—say, for example, A has killed B. Suppose, also, it to be proved that A at the time of killing B was insane. A would be entitled to an acquittal if he, at the time of killing B, was, by reason of insanity, mentally incapacitated to one or other of the following degrees:—

(1) To such a degree as to render him "incapable of knowing the nature of the act," as, for example, if A, in killing B, did so under the insane delusion that he was slaying a wild beast or breaking a jar; or

(2) To such a degree as to render him incapable of knowing that he was "doing what is either wrong or contrary to law," as, for example, if A, at the time of killing B was under the insane delusion

that B was attacking him (A) for the purpose of killing him; for in that case A's insanity would render him incapable of knowing that he was acting contrary to law, seeing that A, were his delusion true, would be justified by law in killing B.

585. On the other hand, A would not be entitled to an acquittal if all that was proved in regard to his insanity was that he killed B under the insane delusion that B had blasted his character; for in that case A, even were his delusion true, would not be justified by law in killing B, and would be presumed, the contrary not being shown, to know the nature of his act, and also that he was acting contrary to law. Criminal responsibility of insanes.

586. It will be clear from the foregoing that the unsoundness of mind must be complete, but it must be remembered that in all such cases the burden of proof falls upon the accused. This is clearly laid down as regards English law in Reg. *v.* McNaughten, 10 *Cl. and Fin.* 200. Unsoundness of mind must be complete.

587. "The jury ought to be told in all cases that every man is presumed to be sane, and to possess a sufficient degree of reason to be responsible for his crimes, until the contrary be proved to their satisfaction; and that, to establish a defence on the ground of insanity, it must be clearly proved that, at the time of the committing of the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act; or, if he did know it, that he did not know he was doing what was wrong. The mode of putting the latter part of the question to the jury on these occasions has generally been, whether the accused, at the time of doing the act, knew the difference between right and wrong, which mode, though rarely if ever leading to any mistake with the jury, is not, as we conceive, so accurate when put generally, and in the abstract, as when put as to the party's knowledge of right and wrong in respect to the very act with which he is charged. If the question were to be put Direction of jury.

as to the knowledge of the accused, solely and exclusively with reference to the law of the land, it might tend to confound the jury, by inducing them to believe that an actual knowledge of the law of the land was essential in order to lead to a conviction, whereas the law is administered upon the principle that every one must be taken conclusively to know it, without proof that he does know it. If the accused was conscious that the act was one which he ought not to do, and if that act was at the same time contrary to the law of the land, he is punishable; and the usual course, therefore, has been to leave the question to the jury, whether the party accused had a sufficient degree of reason to know that he was doing an act that was wrong; and this course, we think, is correct, accompanied with such observations and explanations as the circumstances of each particular case may require."

588. In the same case, the difference between insanity and unsoundness of mind as affecting criminal responsibility is even more clearly laid down. As regards insane delusions the Judges said: "We think he must be considered in the same state as to responsibility as if the facts with respect to which the delusion exists were real. For example, if, under the influence of his delusion, he supposes another man to be in the act of attempting to take away his life, and he kills that man, as he supposes, in self-defence, he would be exempt from punishment. If his delusion was that the deceased had inflicted a serious injury to his character and fortune, and he killed him in revenge for such injury, he would be liable to punishment." Of course, in such a case as this, the actual punishment would depend upon the circumstances of the case, and even though death had been caused, it is improbable that the extreme penalty of the law would be imposed.

Drunkenness.

589. An important example of this is drunkenness. The fact of being drunk—supposing such a state to have been brought about by the voluntary act of the accused—

does not in the eye of the law relieve a man from responsibility for acts committed in such a state. Circumstances, however, might arise, especially in charges where *intention* forms a gist of the offence, in which, though liable to punishment, the accused would not be held liable to the extreme penalty. Thus, a man who, when drunk, struck another man a blow which caused his death would be allowed to show that he had no *intention* of causing death, and that though possibly guilty of culpable homicide, he was not guilty of murder. As regards English law, this principle is clearly laid down; but in Indian law the point is not so clear. Section 86 of the Penal Code provides, "that in cases where an act done is not an offence unless done with a particular knowledge or intent, a person who does the act in a state of intoxication shall be liable to be dealt with as if he had the same knowledge as he would have had if he had not been intoxicated, unless the thing which intoxicated him was administered to him without his knowledge or against his will." It is, however, impossible that the law as thus laid down can be carried out to the letter. *Starling* quotes a case (Reg. *v.* Ram Sahoy Bhar, W. R., 1864, Cr. 24) in which "in a drunken squabble, voluntary drunkenness, though it does not palliate the offence, may be taken into account as throwing some light on the question of intention," and he further goes on to suppose a case in which a drunken man had passed a forged note, which had he been sober, he might or might not have tried to pass. In such a case it is palpable that "the law does not attribute any greater knowledge or intention to a drunken than to a sober man; and the prosecution must prove the intent by surrounding circumstances, as in ordinary cases, and the court or jury may take the fact of the accused having been drunk at the time he committed the act into account in forming a conclusion upon his innocence or guilt." In such a case the fact of drunkenness would not merely serve as mitigation but might bring about an acquittal, though as far as the letter of the Penal Code section is concerned it should not do so. The *Dum Dum* murder case which occurred in

the early part of the year 1890 is a striking example of this. In this case three soldiers were proved to have been drunk, and whilst in that state they made an unprovoked attack upon a native, drove him to take refuge in the water of a tank, and whilst there one of them shot him. The accused were first of all convicted, but on appeal were acquitted, the difficulty apparently being to decide upon which of the three the responsibility for the shot should fall?

Unsoundness of mind when called upon to plead.

590. As regards unsoundness of mind when called upon to plead, the Criminal Procedure Code is very clear. Under Sections 464 and 465, it is provided that when an accused person is "of unsound mind *and consequently incapable of making his defence*," the Magistrate holding the inquiry or trial, or the Court of Session or High Court, in the case of persons committed to trial before these courts, shall first inquire into or try the facts of such unsoundness of mind, and if this be proved, the inquiry or trial shall be postponed. In such cases, under Section 464, the Magistrate should cause the person to be examined by the Civil Surgeon, or such other medical officer as the Local Government directs, and thereupon shall examine such surgeon or other officer as a witness, and shall reduce the examination to writing. In cases of this kind the point to which the attention of the Magistrate or Judge should be most particularly drawn, is the fact of whether the unsoundness of mind is real or feigned. Feigned cases are more probable at this stage than at the previous one (commission of the act). In reference to this subject we will merely draw attention to the remarks in previous chapter.

Deaf and dumb treated as persons of unsound mind.

591. A person who is deaf and dumb, and is therefore unable to plead or to answer a charge, is treated in India as a person of unsound mind. Of course, great care must be taken to ascertain whether (1) the disability is real or feigned, and (2) whether it is of such a nature as to prevent the accused from understanding the charge that has been made against him. When a person is merely deaf or merely

dumb, he can generally be made to understand the natue of the charge so as to enable him to plead, but when he is both deaf and dumb, the matter is more difficult. At present the anomaly might occur of a deaf-mute, otherwise intelligent and perfectly conscious of right and wrong, committing a crime and being subsequently relieved of responsibility on account of inability to plead. In English law the fact of his being intelligent or not must be ascertained. The leading case on this point is Reg. *v.* Pritchard, 7. c. and p. 305. In this case it was ruled as follows :

592. "There are three points to be inquired into—first, whether the prisoner is mute of malice or not; secondly, whether he can plead to the indictment or not; thirdly, whether he is of sufficient intellect to comprehend the course of proceedings in the trial so as to make a proper defence, to know that he might challenge any one of you to whom he may object, and to comprehend the details of the evidence which, in a case of this nature, must constitute a minute investigation. Upon this issue if you think there is no certain mode of communicating the details of the trial to the prisoner, so that he can clearly understand them, and be able properly to make his defence to the charge, you ought to find that he is not of sane mind. It is not enough that he may have a general capacity of communicating on ordinary matters." In both the foregoing cases the jury found that the prisoner was not of sound mind, and the Judge ordered the prisoner to be detained under 39 & 40 Geo. III. c. 94, s. 2. Treating such cases as those of insanity, provision is made for them by the Criminal Procedure Code. Prisoner's intelligence.

593. In this respect, therefore, it would seem as if the Indian law required some amendment, especially as in these days of advanced education, provision is made for the instruction of the deaf and dumb. Indian law requires amendment.

594. The principle which governs the cases of persons accused of a crime applies also to witnesses. An insane person may be a competent witness, but a person of un- Insanity as affecting witness.

sound mind cannot. The Indian Evidence Act (Section 118) explains that "a lunatic is not incompetent to testify unless he is prevented by his lunacy from understanding the questions put to him and giving rational answers to them." A singular case occurred within Mr. Gribble's experience. About twenty-seven years ago, a partner in one of the most eminent firms in the country suddenly became insane. The delusion under which he suffered was that he was Jesus Christ and that it was his mission to convert the world. On other matters he was quite sane. Mr. Gribble met this gentleman in a room without knowing who he was. For some time he conversed on various subjects in a most rational manner, and then drawing nearer to his companion, said: "Do you know who I am? I am Jesus Christ! Do you see this whistle on my chain? If I blow it all the world will be converted, but I don't intend to go about it in that way. I have bought a newspaper and mean to have it photographed, and shall then distribute it over the world!" The astonishment can well be imagined. Subsequently the gentleman recovered. Now, this person although undoubtedly insane would have been a perfectly competent witness on any other subject than the one regarding which he was under a delusion. He could have given a trustworthy and intelligible account of an ordinary transaction, and only became unreliable when something was said that reminded him of his delusion.

Deaf-mutes as witnesses.

595. A case occurred in which the evidence of a deaf mute was accepted in a criminal case. The charge was one of robbery and the deaf-mute was an eye-witness. The man had very considerable intelligence and quickly comprehended questions by signs. Eventually he narrated the whole circumstances of the offence by gestures. He pointed out the accused, imitated his walking stealthily after the complainant, and then went through the pantomime of striking and robbing him. There was other corroborative evidence as regards the property stolen and the accused was convicted. He appealed, but the conviction was upheld. The difficulty

in the case was the administration of an oath, but from the man's gestures it was clear that he understood that the proceedings were of peculiar solemnity, and that if he described an untruth, he would be punished. This after all is the main test of a witness' veracity in this country where there is not so much of the religious element in a solemn affirmation as there is in an oath in England. In Reg. *v.* Jackson (Bedford, 1844), Alderson, B. held, that before the evidence of a dumb witness can be received, the Court must be satisfied that he understands the obligation of an oath.

Testamentary capacity.

596. By testamentary capacity is understood the power of making a valid will, or, as it is technically called, a disposing mind, and the same distinction between insanity and unsoundness of mind applies. It must be proved that at the time of making the will the deceased was mentally incapacitated to a certain degree or extent (LYON). "This degree may be defined to be that he either—(1) did not know the nature of the act he was performing; or (2) was not fully aware of its consequences; or (3) had made a disposal of his property which he would not have made had his mind been sound, under the influence of a delusion, or a disorder of the mind, perverting his affections or sense of right." (Banks *v.* Goodfellow and Smee *v.* Smee.—*Ibid.*)

Test of capacity to make a will.

597. TAYLOR rightly says that the best test of capacity for making a will is that a man at *the time of signing* should know the nature and amount of his property and the just claims of those who are nearly related to him. The words are italicized with intention, for it must be borne in mind that actual insanity previous to or subsequent to the signing of the will would in no way affect its validity if it could be proved that at the time of signing he was of sound mind. A will made and signed during a lucid interval would therefore be perfectly valid, though it should be noted that if previous and subsequent insanity can be proved the burden of proof that the signature was attached during a lucid interval would rest upon those asserting the fact.

48

Will valid if mind unimpaired.

598. Bodily disease and incapacity do not affect the validity of a will as long as the mind is unimpaired. A very important case on this point is that of the Duchess of Manchester. The Duchess was proved to have been suffering from convulsions more than a month before the will was signed, that she had another attack on 1st October, and, according to some witnesses, was suffering from acute mania with symptoms of inflammation of the brain. The will was signed on the 26th October, 1848; the Duchess died on the 21st November, and there was evidence to show that she had some delusions both before and after its execution. One of the witnesses was the family Doctor, and he was able to swear that at the time of execution the Duchess was well aware of what she was doing. The issue raised was—Was she or was she not in a competent state of mind at the time of executing the will? The jury found that she was competent, but a new trial was subsequently granted, which however did not come off as the case was settled without it. When a medical man witnesses a will, he should be careful to satisfy himself regarding the soundness of the testator's mind. He should remember, says Taylor, that when he signs his name he is practically testifying to the competency of the testator to make the will.

Insanity as affecting civil rights and liberty.

599. One other point only remains to be considered and that is how insanity affects a person's civil rights and liberty. If incapacity is proved, the individual may be deprived of the control and management of his property and a person appointed to manage it for him. In India the procedure to be adopted is laid down by Acts 34 and 35 of 1858, the first of which applies to High Courts and the second to other Courts. Here also the insanity must be of such a nature as to render the person incapable of managing his own affairs. Mere eccentricity is not sufficient, and a person suffering under a delusion might be perfectly capable of managing his affairs. Of course, if the delusion was of such a nature as to render him dangerous

to the public or to any person, it might be a sufficient reason to place him under restraint.

Restraint of lunatics.

600. In the case of criminal lunatics, *i.e.*, persons proved to have been of unsound mind at the time of the commission of the offence, and persons who have been prevented from pleading by reason of insanity, they are sent to the Lunatic Asylum under order of the Court. As regards other lunatics, they can only be received in a lunatic asylum if sent by a Magistrate, Commissioner of Police or Civil Court. In such cases only one medical certificate is required. This certificate must be in accordance with the form laid down in the Act, and must be signed by the medical practitioner after an examination as prescribed by the Act. In the case of Asylums in the Presidency towns, and stations of the Straits Settlements, an order of the Magistrate, Police, or Civil Court is not required, but a person can be received in an asylum if accompanied by a statement (Form B) signed by two persons, each of whom shall be a physician or surgeon, and one of whom shall be a presidency Surgeon or a Surgeon in the employ of Government. It seems unnecessary to dwell at further length on this subject, since all action in this respect should be taken after consultation of the Act, a reference to which is therefore absolutely necessary.

Law on commitment of insanes to lunatic asylums.

601. In India, according to the Lunatic Asylum Act (36 of 1858), lunatics (other than lunatics sent to Asylums by order of a criminal court) may only be received into an Asylum under the following conditions :—

(1) If sent by a Magistrate, Commissioner of Police, or Civil Court. In this case only one certificate is required. This certificate must be in the Form shown as Form A in the Schedule of the Act, and must be signed by a medical officer, after examination of the lunatic (Sections 4 and 8).

(2) But this applies to Lunatic Asylums in the Presidency towns and stations of the Straits Settle-

ments only on presentation of an order and statement filled up in the form shown as Form B in the Schedule of the Act (Act XXXVI) of two persons each of whom shall be a physician or Surgeon and one of them shall be a Presidency Surgeon, or a Surgeon in the employment of Government (section 7).

602. Section 2 of Act XXXVI provides for the appointment of visitors to asylums, two or more of whom by Section 3 are to visit the asylum at least once in every month; and by Section 12, defective or incorrect orders or medical certificates may, with the sanction of two or more of the visitors, one of whom must be a medical officer, "be amended by the person or persons signing the same." The form of medical certificate prescribed in the Indian Act (like that prescribed in England), requires the person signing it, it will be observed, to give the grounds on which his opinion has been formed in the form of (1) facts indicating insanity observed by himself, and (2) other facts (if any) indicating insanity communicated to him by others.

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SECTION V.

CHAPTER I.

POISONS.

Definition of poison—General characters of symptoms of poisoning—Channels of access of poisons to the system—Local action of poisons—General evidence of poisoning—Effects produced by poisons—Manner of conducting inquiries in cases of suspected poisoning—Channels for getting rid of poisons—Points to be noted in cases of alleged poisoning—Medical officer's duty—Clean vessels a necessity—Errors regarding arsenic poisoning—Possibility of case of poisoning even if poison not found—Evidence of poisoning how obtained—Experiments on animals with suspected substances—Comparative experiments on animals—Statistics of poisoning—Non-alkaloidal irritants—Untraceable poisons—Action of poisons may be modified under various conditions—Dr. Van Steyzen's remarks on poisons—Extracts from Madras Administration report—Poisons most generally used—Statistics of poisoning in Madras—Statistics of huaman poisoning in Bembay—Statistics of human poisoning in Bengal.

THE Indian Penal Code contains no definition of poison. TAYLOR defines it as "a substance which, when absorbed into the blood, is capable of seriously affecting health or of destroying life." GUY defines it as "any substance or matter, solid, liquid, or gaseous, which, when applied to the body outwardly, or in any way introduced into it, without acting mechanically, but by its own inherent qualities, can destroy life." This latter definition is framed especially to exclude such substances as powdered glass, steel, etc., which inflame and injure the internal parts. It seems, however, difficult to understand why these substances should be excluded. Beck says, that the "Ancients considered everything as poisonous which produced malignant symptoms, and attacked directly what we style the vital principle." For the purposes of cases which come before the Indian criminal courts, no definition of poison would seem to be necessary, because any act done with the intention of causing injury, no matter by what mean, caused, is a punishable offence. If the act causes deaths

Definition of poison.

the offence becomes murder or culpable homicide; and if the act does not cause death, but has been committed with intent to cause death, it would be an attempt to murder. If the act was intended to cause injury, and did cause injury, the offence would amount to grievous hurt or simple hurt, according to the amount of injury caused. A person might therefore be found guilty of attempting to commit murder by administering a perfectly harmless substance, if only the person administering believed the substance likely to cause death, and intended that it should cause death. There is a widely-spread belief, especially in oriental countries, that diamond dust is a poison most fatal in its effects. Beyond tradition, however, there is no evidence whatsoever to show that there is any foundation for this belief, and what evidence there is, goes to show that diamond dust is a perfectly harmless substance. But a person who believed in the dangerous properties of diamond dust, and who administered it with the intention of causing death, would be guilty of an attempt at murder, even though no injury should ensue. As an example of this, we may cite the celebrated case of the *Guicowar of Baroda*. What therefore is required in this country is, not only evidence as to whether the substance administered falls under the regularly accepted definitions of poisons but evidence regarding the act of administering, and the intention of the administering person.

General characters of symptoms of poisoning.

603. The symptoms produced by poisoning possess certain general characters, *viz.*—

(1) They arise suddenly. This character, however, may be absent in a case of poisoning, *e.g.*, in chronic poisoning by lead, mercury, phosphorus, etc., and may be present in cases not of poisoning, *e.g.*, apoplexy, cholera, etc.

(2) They steadily increase in severity.—This character, like the last, is often present in disease. Again, in some cases of poisoning, this character

is absent, *e.g.*, in the remittent form of opium poisoning (see case B 1) and in cases where small doses of a poison are administered at short interval.

(3) They are uniform in character, *i.e.*, with the known effects of a particular poison, hence gastritis followed by salivation as in acute mercurial poisoning, or by paralysis as in acute arsenical poisoning, do not form exceptions, to this rule.

(4) They commence soon after taking food, drink, or medicine. This character may be absent owing to the symptoms of poisoning being delayed in their appearance by sleep or by intoxication, or by the counteractive effects of another poison simultaneously administered; or again, this character may be absent, owing to the nature of the poison swallowed; for example, sparingly, soluble lead salts only give rise to acute symptoms after an interval of several hours, and a similar interval is often noticed in cases of fish poisoning. This character also may be present in cases not of poisoning, *e.g.*, cholera, apoplexy, etc., may come on soon after a meal, or rupture of the stomach may occur, and symptoms, closely resembling those of poisoning, have appeared from swallowing a quantity of cold fluid after exertion.

(5) Others are affected who partake of the same food, etc. This is a very striking character; it may however be present in disease, *e.g.*, where, as sometimes happens, several persons after partaking of a meal together, are nearly simultaneously attacked by cholera. This character may be apparently absent in a case of poisoning, *e.g.*, where of several persons present at a meal only one partakes of a particular dish. Poisoning

also may be indicated by the fact that several persons have suffered from suspicious symptoms, after partaking of articles of food, etc., which have passed through the hands of one and the same individual, although the attacks occurred at different places and at different times.

(6) They appear in persons previously in good health. This character may obviously be absent in cases of poisoning or present in cases of disease.

(7) They prove rapidly fatal. This character, like the last, is one which may be absent in poisoning and present in disease.

Obviously the greater the number of the above characters present in the same case, the stronger would be the suspicion of poisoning; and *vice versâ*, the smaller the number, the weaker the indicationof poisoning.*

Channels of access of poisons to the system.

604. A poison may produce its effects owing to its having been admitted by the mouth, inhaled into the lungs, absorbed through the skin, injected into wounds, or introduced into the rectum or vagina. The action of a poison may be local or remote, or both.

Local action of poisons.

605. The local action of a poison may consist in the production of (1) corrosion, *i.e.*, chemical destruction as in the case of strong mineral acids; (2) irritation and inflammation as in the case of cantharides, tartar emetic, etc., or (3) certain nervous impressions as in the case of opium, aconite, etc. †

General evidence of poisoning.

606. The general evidence of poisoning is obtained from the symptoms produced, the *post-mortem* appearances in case of death, chemical analyses of the excreta and secretions, and even of some of the solid organs and tissues of the body, from experiments on animals and from the moral evidence.

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* LOYN's *Medical Jurisprudence for India, 2nd Ed., pp.* 119, 120.

† LYON's *Medical Jurisprudence for India,* 2nd ed., p. 114.

607. With regard to the manner in which poisons produce their various effects upon the human economy, the following tables will be useful, the mode of action being divided into two classes, namely, (1) local, and (2) remote :— Effects produced by poisons.

I.—LOCAL :—

(*a*) Corrosion of the part to which the poison is applied.	Strong acid, alkali, etc.
(*b*) Inflammation the result of irritants applied to a part.	Arsenic, cantharides, etc.
(*c*) Effects on the nerves of motion and sensation.	Dilatation of the pupil by belladonna, by tingling of the tongue and skin by aconite, paralysis by conine.

II.—REMOTE :—

(*a*) Common—not to be distinguished from the effects of injury or disease.

(*b*) Specific—peculiar to the poison itself—

(1) General—affecting the whole system.—Antimony.

(2) Partial—acting on a particular organ.—Strychnine.

Comparative summary of the general evidence of Poisoning.

POISON.	NATURAL CAUSES.
I.—The symptoms come on suddenly and rapidly progress.	I.—Many diseases come on suddenly—cholera, gastritis—and run a rapid course to a fatal termination.
II.—The symptoms begin while the person is in sound health.	II.—Some acute diseases begin under like circumstances.
III.—The symptoms of poisoning go on from bad to worse in a steady increase.	III.—This is also the case with many common diseases.
IV.—Uniformity in the nature of the symptoms.	IV.—The uniformity of the symptoms is common to many diseases ; but in some cases the absence of uniformity may be a proof of disease.
V.—The symptoms come on immediately after a meal.	V.—Apoplexy, colic, cholera, & some other diseases may follow a meal ; but the fact that some hours have elapsed since the last meal is against the probability of poisoning.

VI.—Several persons are attacked after partaking of the same meal with the same symptoms.	VI.—As a general principle it may be stated that there is no disease likely to attack several persons at once, but cases are on record of this having occurred.
VII.—Poison found in the food, vomited matter, urine, etc.	VII.—Poison may be mixed with the food, etc., in cases of imputed poisoning.

Manner of conducting inquiries in cases of suspected poisoning.

608. Cases of poisoning in which the victims recover are, comparatively speaking, rare, and the cases which generally come before a criminal court in this country are those which have had a fatal termination. In such cases, the two important points to be proved are—(1) the actual cause of death, and (2) what person caused it. As regards the first point, the most important evidence will be that of the chemical examiner, who alone is competent to say, from the result of his examination, whether any poison was discovered, and, if so, what the poison was. But important though his evidence is, there are many other points to which attention must be paid by the various officials and individuals connected with the case from the time of the death until the time of trial. So important are these points, that it very often happens that the life or death of the accused depends entirely upon the accuracy with which they have been noted.

Channels for getting rid of poisons.

609. The various channels* for the elimination or getting rid of poisons from the body are—the kidneys (urine); liver (bile); lungs (expired air); salivary glands (saliva); skin (sweat); mammary glands (milk); and mucous membranes generally.

* Poisons have been detected in the blood, and the fluids secreted from it—urine, saliva, and milk— may contain portions of the poison taken, and produce dangerous symptoms when given to other animals. Poisons applied to the brain tissue, or to nerve trunks, do not produce symptoms, and the action of a poison may be arrested for a time by compressing by a ligature the main vessels of the limb, under the skin of which the poison has been injected. After death no trace of the poison may be detected, the quantity taken being just sufficient to produce a fatal result, or elimination may be so rapid that, although death was directly due to the poison, any remains of its existence cannot be made out. This occurred in the case of Dr. Alexander, who died from an accidental dose of arsenic, all the arsenic being eliminated in *seventeen* days; in another fatal case, in *seven* days. (TAYLOR).

610. Presuming that, immediately after receiving notice of a suspicious death, the village authorities have sent to the nearest police station and that an enquiry has been at once commenced, the following are the points about which the fullest information should be available. They have been given *inter alia* in the INTRODUCTION, page 11, paragraph 13, but for facility of reference they are repeated here :— Points to be noted in cases of alleged poisoning.

(1) The exact time of death.

(2) When and where the deceased was last seen alive.

(3) The exact attitude and position of the body when found.

(4) The position of all surrounding articles, such as bottles, papers, weapons, or spilled liquids. [These articles should be collected and preserved.]

(5) What were the symptoms of the deceased when first noticed, and how long did they continue ?

(6) How long after partaking of any meal, food, drink or medicine, did the symptoms occur ?

(7) Did they intermit, or continue without mitigation until death ?

(8) Secure any portion of the food or medicine which may be suspected to contain poison.

(9) Secure all matter vomited and evacuations.

NOTE.—When securing food or vomited material, etc., be most careful to put each matter separately in a *clean* pot or vessel ; do not take any old pot, or piece of pot, that may be offered, but insist upon being provided with a new and clean glass, or earthen vessel, which should at once be securely fastened and carefully guarded until it is given into the hands of the medical officer.

(10) Note the external appearance of the body, and all marks of violence, etc.

(11) Note any other suspicious circumstances and all statements of suspected parties.

(12) Finally, having noted these points, and after having caused them to be entered in the *mahazarnamah*, or report of the inquest held by the village authorities, have the body *at once* taken to the nearest hospital or dispensary; accompany it there, and take with you all matters and articles connected with the case. Be careful that no unnecessary delay occurs in this respect, for it is of importance that the body should arrive at the hospital before decomposition sets in.

Medical officer's duty.

611. Arrived at the hospital, the medical officer must at once commence the *post-mortem*, and he will, of course, see that this is most carefully done. The medical officer's duty is to ascertain the cause of death, and he should be careful not to listen to any story that may be told him by the persons who bring the body, but should simply form his opinion on the facts which he is able to elicit from his examination. In cases of suspected poisoning, he has, of course, to send the stomach and the purged and vomited matter, together with any cloths, implements, etc., to the chemical examiner.

Clean vessels a necessity.

612. Too much importance cannot be attached to the necessity of seeing that all matter submitted for chemical analysis is put in clean vessels, and is safely and securely sealed. An instance has occurred, in which viscera have been placed in a vessel which had formerly contained arsenic and had been carelessly cleaned, which was discovered by arsenic being detected on the *outside* of the stomach. Inquiries were made, and it was then elicited that the jar had not been carefully cleaned. Other cases have occurred in which there have existed strong grounds

for believing that the articles sent for examination had been tampered with whilst in transit and arsenic inserted.

613. Whilst on this subject, it would be as well, perhaps, to impress upon sub-magistrates that arsenic in a soluble form does not mean arsenic that has been digested. This is by no means an uncommon error on the part of Native sub-magistrates, who, when they receive the chemical examiner's certificate, that arsenic in a soluble form has been found, at once conclude that the arsenic so found must have passed into the stomach by the ordinary natural means of the mouth. This is not the case, and arsenic added to the viscera after the *post-mortem* examination, would present exactly the same appearance as arsenic which had been administered by natural means. It would be reported as existing in a soluble form, that is, in a form capable of being held in solution. It will, therefore, at once be seen how great is the importance of care and cleanliness in securing viscera and other substances believed to contain poison. One piece of carelessness in this respect might throw such doubt on the evidence, that a guilty man might possibly be acquitted, or, on the other hand, it would open the door to the possibility of an innocent man being found guilty.

Errors regarding arsenic poisoning.

614. "It should be borne in mind that, although no poison has been found, the case may yet be one of poisoning:—

Possibility of case of poisoning even if poison not found.

(*a*) From the poison having disappeared by evaporation (as in the case of prussic-acid poisoning), or having been removed from the body by evacuation* or by elimination after absorption. This is specially likely to occur in the case of very volatile (*e.g.*, gaseous) poison, or in the case of very soluble poisons, as in poisoning by corrosive acids, or in cases where an individual has lived for some time after swallowing the poison.

* By vomiting or purging or both.

(*b*) From neglect to submit certain matters (or a sufficient quantity thereof) for analysis, *e.g.*, in cases where the individual has lived for some time after administration of the poison, and no portion, or only very small portions, of the solid viscera are submitted to the analyst. Again, of several articles of food, one alone may contain poison, and this may not have been submitted.

(*c*) From the poison having undergone decomposition or chemical destruction by oxidation or putrefaction. This may occur in the case of organic, but rarely so, in the case of inorganic, poisons.

NOTE.—It is possible that some organic poisons may undergo destruction, by oxidation in the body during life. Organic poisons, again, may be destroyed by putrefaction after death. Some poisons, however, *e.g.*, strychnia and opium, have been found to resist putrefaction for long periods, nevertheless in many cases of strychnine poisoning, with uneqivocal symptoms, this drug could not be detected after death.

(*d*) From there being no reliable means of extracting the poison from substances containing it, or no satisfactory tests for its identification.

(*e*) From want of care or skill on the part of the analyst.

(*f*) From smallness of the dose.

Evidence of poisoning how obtained.

615. The evidence with regard to poisons is gathered from—(*a*) the symptoms produced during life, (*b*) chemical analysis, and (*c*) experiments on animals.

Experiments on animals with suspected substances.

616. With regard to experiments on animals, this consists in the administration of suspected substances such as portions of—

(*a*) *Food.*—This is often employed as a rough preliminary test for the presence of poison.

(*b*) *Vomited matter.*—An experiment of this kind is sometimes the result of accident, and is open to

the fallacy that normal secretions—*e.g.*, bile—may, when swallowed by animals, cause symptoms of poisoning.

(*c*) *Eliminated poison.*—This is specially useful in the case of organic poisons, for which there are no distinctive chemical tests, *e.g.*, aconitine and daturine. The term *physiological test,* is often used to denote a test for the recognition of a poison dependent on its action on living animals.

617. In a case of suspected poisoning by a substance the action of which is not well known, it may prove useful to administer to an animal a dose of the poison supposed to have been employed, so that the symptoms present in the case may be compared with those which arise in the animal experimented on. Experiments of this kind are open to two objections— Comparative experiments on animals.

(*a*) Some animals are apparently unaffected by poisons which act violently on man, *e.g.*, pigeons appear to be unaffected by opium, some varieties of monkeys appear to be unaffected by strychnia, and rabbits appear to be unaffected by belladonna. It should be noted, however, that poisoning in the human subject may arise from eating the flesh of animals that have fed on plants which are not poisonous to the animal but poisonous to man.

(*b*) The symptoms produced in the animal experimented on may be different from those of the case, although the same poison was used in both, either from the action of the poison on the animal being different to its action on man, or from failure to properly proportion the dose to the size of the animal.*

* LYON'S *Medical Jurisprudence for India*, 2d. Ed., pp. 126—127.

Statistics of poisoning.

618. Of the total deaths occurring yearly in England, about 1·25 per cent., or 8·77 per million of the population, are due to poison. In the Bombay Presidency the deaths from poison recorded yearly correspond to about 6·8 per million of the population or about 1·75 per cent. of total deaths from violence in each year. In Bengal (including the North-West Provinces and Oudh, Central Provinces, and the Punjab) for the three years ending 1872 there were 1,140 deaths from poison, or 380 annually. (Harvey).

Non-alkaloidal irritants.

619. Of the non-alkaloidal* irritants, the great majority are difficult of detection by chemical analysis, "hence many can only be recognised by their botanical or physical characters. A few, however, contain matters separable from organic liquids or mixtures by chemical processes and capable of identification by chemical or physiological tests." (Lyon).

Untraceable poisons.

620. It should be remembered that, although great advances have been made in the knowledge of poisons, there are still some poisons which cannot be detected. It does not, therefore, necessarily follow that because the chemical examiner is unable to find any trace of poison in the remains submitted to him, no poison has been submitted. Again, in other cases, the chemical examiner may certify that a poison has been administered, but at the same time he may be unable to say what the poison is. For instance, during the year 1883, Dr. Rogers, in his report, says that "unidentified organic poisons were detected in eight cases * * *. By chemical processes, an unknown poison may be extracted in a comparatively pure condition from a large bulk of organic matters, and its detection, therefore, greatly aided, but so long as the substance cannot be identified, its poisonous character cannot be established by chemical tests."

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* An *alkaloid* is a body resembling an alkali, and having a highly complex organic composition, and contained in the vegetable kingdom, such as strychnine, quinine, etc.

621. Certain causes may modify the action of a poison, the chief of which are :—

Action of poisons may be modified under various conditions.

(1) *Quantity administered.*—The administration of a large dose of some poisons is sometimes followed by symptoms differing greatly in character from those which follow a moderate dose, *e.g.*, moderate doses of arsenic produce irritant symptoms, very large doses sometimes cause death by shock without irritant symptoms.

(2) *Difference in form.*—(1) *Physical difference :*—Poisons act most rapidly when gaseous, next when liquid, next if in fine powder, and lastly, rapidly when in solid masses. (2) *Chemical difference :*—This may have the effect—(*a*) if the poison acts chemically only, of rendering an active poison inert, *e.g.*, corrosive acids may be rendered inert by combination with alkalies, or (*b*) if the poison does not act chemically only, chemical difference in form may, by rendering the poison more soluble, increase the rapidity with which it acts, or by rendering it less soluble, diminish the rapidity of its action.

(3) *Mechanical mixture* with inert substances, *e.g.*, dilution or mixture with inert powders. In some cases this alters the character of the symptoms produced, for example, corrosive acids when diluted act as irritants only. In other cases, mechanical mixture with an inert substance, by protecting the poison from absorption, may delay its action; hence poisons, as a rule, act less rapidly when given on a full stomach. Again, animal charcoal, by taking up a poisonous alkaloid and rendering it insoluble by adhesion, may delay or prevent its action.

(4) *Mode of introduction.*—This, by affecting rapidity of absorption, affects the rapidity of action of poisons. The modes of introduction are here enumerated in order of rapidity of action, namely,—(1) injection into a vein; (2) application to a wound; (3) application to a serous* surface; (4) application to the broncho-trachial mucous membrane; (5) introduction into the stomach; (6) injection into the rectum; and (7) application to the unbroken skin.

(5) *Habit.*—This, in the case of many poisons, *e.g.*, opium, alcohol, and tobacco, tends to confer on the system a resisting power to the action of the poison to the use of which the individual is habituated.

(6) *Idiosyncrasy.*—This may show itself either in abnormal sensitiveness (or the reverse) to the action of a particular poison, *e.g.*, mercury, or the individual may be exceptionally affected by a drug, *e.g.*, purged by opium or by an article of food.

(7) *Existence of disease.*—This, if the symptoms of the disease resemble those produced by the poison, tends to confer increased sensitiveness to the action of the poison, *e.g.*, narcotics in advanced renal disease. If, on the other hand, the symptoms of the disease are opposed in character to those produced by the poison, diminished sensitiveness to the action of the poison may be the result, *e.g.*, narcotics in tetanus.

(8) *Sleep and intoxication.*—These may delay the action of a poison.

**Serous* here refers to a particular kind of animal membrane which secretes serum, a watery fluid.

(9) *Accumulation.*—Small doses of poison, each insufficient to cause any serious effect, if given one after the other at short intervals, may accumulate in the system and produce serious effects. Accumulation obviously tends to occur when the rate of elimination of the poison is slower than the rate of its administration. Hence, poisons which are only slowly eliminated from the body—*e.g.*, lead and mercury and metallic poisons generally—are specially prone to act as cumulative poisons. Organic poisons are, as a rule, quickly eliminated. In some, however, *e.g.*, strychnia, the rate of elimination is comparatively slow, and accumulation tends to occur.*

Dr. Van Steyzen's remarks on poisons.

622. Dr. Van Steyzen, Chemical Examiner of Madras, in his annual report for 1888, says : "At the same time, such poisonous principles extracted from the viscera are not necessarily connected with the cause of death, nor are they to be regarded as having been introduced into the system during life, for alkaloid poisons are developed in the cadaver (or dead body) resembling in many respects some of the more common vegetable poisons. The discovery of the alkaloids of putrefaction, though not of very recent date, threatened to outrun the resources of the medico-legist, but since Selmi of Italy and Otto of Germany successfully contested the conclusions for the prosecution in two celebrated cases of criminal poisoning, such an impetus was given to scientific workers, on account of the medico-legal importance of these 'ptomaines,' that although exact differentiation is in some cases a matter of much delicacy and difficulty, the possibility of distinguishing a vegetable alkaloid introduced during life from a 'ptomaine' is in many cases, at any rate, fortunately established."

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* LYON'S *Medical Jurisprudence for India*, pp. 115—116.

Extracts from Madras Administration Report.

623. The cases referred to by Dr. Rogers were as follow :—

Bellary.—Only one case was received from this district. It was reported that the deceased, a man *æt.* about 45 years, who had been suffering from piles, took some medicine from an old woman for their cure; and that after taking this medicine, he foamed at the mouth, vomited and purged, and died on the following day. The remainder of the suspected medicine was found to contain a powerful irritant, and a small quantity of a similar, and probably identical, poison was extracted from the stomach and vomited matters.

Godavari.—One case was received from this district, and in this case it was reported that a woman noticed a feeling of burning and numbness about the throat and mouth after eating a little of some sugar which had been given to her. Very small pieces of a root, possessing very powerful narcotico-irritant properties, were extracted from the sugar.

Kistna.—In the case received from this district, it was reported that the deceased man was in good health at 8 P.M. when he took his supper, and that immediately afterwards he was seized with symptoms of irritant poisoning and died at midnight. At the *post-mortem* examination, the alimentary canal was found to be intensely congested. An irritant poison was extracted from the vomited matters, but the examination of the viscera did not give conclusive results. The examination was, however, conducted under unfavourable conditions, as all the viscera were sent up in one very large jar—the new rules, which direct that the contents of the stomach and the small intestines should be packed separately, not having come into operation.

Kurnool.—Two cases were received from this district. In the first case it was reported that three boys, after

eating some jaggery given them by a man, became giddy and vomited. All three boys seems to have recovered. From the vomited matters a poisonous alkaloid was extracted. In the second case two persons, after eating some suspected food, complained of a bitter taste in the mouth and a burning sensation in the throat. Vomiting seems only to have occurred after taking verdigirs as an emetic. Six lots of food were forwarded for examination, and one lot was found to contain an irritant poison, but the quantity of poison present was not sufficient to destroy life.

Madras.—One case was forwarded by the Commissioner of Police. The history of the case was briefly as follows: On two occasions many people became sick after eating sweetmeats prepared by an old Mussulman woman for some religious ceremony. On the first occasion, the indisposition of the persons eating the sweetmeats did not give rise to any suspicion of foul play, as it was accounted for by the theory that Allah was displeased at the festival not having been observed at the usual place, *viz.*, thousand-lights bazaar. But on the second occasion, when sixteen people suffered from vomiting and purging, suspicion was aroused, and two lots of the suspected sweetmeats, with five lots of jaggery, ghee, and suggar used in their preparation, and also two lots of purged matters, were submitted for examination. An organic irritant poison was found in one of the two lots of suspected sweetmeats.

Trichinopoly.—A case was received from the police hospital, of which the history was to the effect, that the deceased, a young man aged about 18, was suspected to have died from a narcotic poison of some sort. He was reported to have left his home at noon in good health, and to have been found insensible at 5-30 P.M., and to have died at midnight. No odour of any narcotic could be perceived about the mouth. Coma was complete, the pupils being slightly dilated, and there was some frothing at the

mouth. A narcotic poison was suspected, as the father of the deceased sold opium and *Cannabis Indica.** A narcotico-irritant poison was extracted from the stomach contents, in which was also found a considerable quantity of a caoutchouc-like substance.

Cuddapah.—A case occurred in Cuddapah which will illustrate this. A man died suddenly under very suspicious circumstances. There was enough evidence to warrant the arrest of a certain person, and if the chemical examiner had been able to certify to the finding of any poison in the stomach, there is little doubt that the prisoner would have been committed for trial. The chemical examiner, however, was unable to find any poison, and the sub-magistrate, considering that the cause of death had not been sufficiently established, released the accused. In a case of this kind, where the attendant circumstances are sufficient to raise a strong suspicion, it would seem to be advisable to commit the prisoner to stand his trial, even although the chemical examiner has been unable to certify to the presence of poison. This occurred in the celebrated *Palmer* case. For further remarks on this head, see the chapter headed STRYCHNINE.

Poisons most generally used.

624. The following are the poisons which are most generally in use in India :—

Mineral poisons.—*Arsenic.*—For details, see next chapter.

Mercurial compounds.—Arsenic is sometimes administered along with mercury. The mercurial compounds most commonly employed are—corrosive sublimate, calomel, and cinnabar or sulphuret of mercury. The following

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* Indian hemp.

memorandum of recent mercurial cases was kindly sent by the late Dr. McNally :—

July 8, 1884 ...	... Kumbakonam—fatal*		All corrosive sublimate, unmixed.
August 20, 1884	... Mayaveram—fatal*		
August 28, 1884	... Satur—recovery		
September 1st, 1884	... Vilapuram—recovery		

Nitric acid poisoning occurs very rarely, but was found, during 1883, in two lots of coffee received from the Commissioner of Police in a case of attempted poisoning, in which it was suspected that some strong mineral acid had been used.

Organic poisons.—Aconite was detected in two cases in 1883 (one fatal), and four cases in 1882 (three fatal).

Dhatura was detected in two cases in 1883 and in one only in 1882.

Gunjah was detected in three cases in 1883, and in 1882 there were five cases with symptoms of Gunjah.

Nux vomica was detected in five cases in 1883, of which four were fatal.

Oleander was detected in two cases in 1883 (one fatal), and in three cases in 1882 (one fatal).

Opium was detected in four cases in 1883 (three fatal), and in five cases in 1882 (all fatal).

Plumbago zeylanica.—The use of this poison is by no means uncommon; five cases occurred in 1882 and three in 1883.

The details of the above-mentioned poisons will be found under their respective headings.

Statistics of poisoning in Madras.

The following table, showing the total number of poisoning cases in Madras Presidency during the last five

* It is significant that these two places are close together.

years, has been kindly sent to me by Dr. VanGeyzel, the Chemical Examiner.

Majnum, a sweetmeat in which pounded Dhatura seed is mixed; an intoxicant rather than a poison, and used by poisoners to facilitate robbery or casual connection rather than death.

Statistics of Human Poisoning in the Presidency of Madras.

Year.	Arsenic.	Mercury.	Other metals.	Opium.	Dhatura.	Aconite.	Other vegetable poisons.	Total cases examined, including also those in which no detection was made.
1885	35	7	3	5	3	1	10	128
1886	46	4	8	6	4	...	6	131
1887	37	9	5	1	...	4	6	109
1888	28	5	8	6	3	5	18	127
1889	33	10	2	7	4	8	22	136
Total...	179	35	26	25	14	18	62	631

Statistics of Human Poisoning in the Presidency of Bombay.

Statistics of human poisoning in Bombay.

Year.	Arsenic.	Mercury.	Other Metals.	Opium.	Dhatura.	Aconite.	Other vegetable poisons.	Total cases examined, including also those in which no detection was made.
1885	51	4	8	20	5	1	9	187
1886	47	4	14	12	4	...	6	159
1887	42	1	14	14	5	...	8	159
1888	41	5	11	15	5	...	7	182
1889	33	3	5	20	3	...	2	170
Total...	214	17	52	81	22	1	32	857

Statistics of human poisoning in Bengal.

Statistics of Human Poisoning in the Presidency of Bengal.

Year.	Arsenic.	Yellow arsenic and opium.	Mercury.	Mercury and arsenic.	Nitric acid.	Carbonic oxide.	Hydrocyanic acid.	Other metals (sulphate of copper.)	Alcohol.	Chloral hydrate.	Carbolic acid.	Salicylic acid.	Opium.	Dhatura.	Aconite.	Opium and sulphate of copper.	Other vegetable poisons.			Total number of viscera examined including cases in which no detection was made.
																	Strychnine.	Brucia.	Morphia.	
1885 ...	37	...	...	...	...	...	...	...	...	...	...	...	56	(1 atrop.*)	4	...	3	...	6	234
1886 ...	48	...	...	...	...	...	...	1	...	1	1	1	52	2 (atrop.*) 1 dat.	1	1	1	1	2	266
1887 ...	36	...	1	...	1	...	...	1	...	...	...	...	56	(1 atrop.*)	1	...	...	...	7	233
1888 ...	25	1	...	...	...	2	3	...	1	...	...	...	52	(2 atrop.*)	...	...	1 (strych.) 1 (nux vomica.)	...	...	199
1889 ...	29	...	1	4	...	...	1	...	...	...	...	...	50	1	...	...	1	...	14	209
Total...	175	1	2	4	1	2	4	2	1	1	1	1	266	8	6	1	7	1	29	1141

* Atropine.

Note.—These tables have also been provided through the kind agency of Dr. VanGeyzel.

CHAPTER II.

POISONOUS IRRITANTS AND ARSENIC.

Three classes of poisons—Action of poison how modified—Irritant poisons—Difference between corrosive and irritant poisons—Diseases whose symptoms resemble irritant poisoning—Irritant poison—Cholera—English cholera—Gastritis—Enteritis—Peretonitis—Perforation of the stomach—Hernia—Intussusception of the bowels—Colic—Statistics of cases of arsenic poisoning—Attempts at poisoning by arsenic—Case of Kimidi Maharani, poisoned with white arsenic—Common forms of arsenic—Various forms of arsenic distinguished by color—White arsenic and arsenicum—Legitimate uses of arsenic—Criminal poisoning by arsenic—Symptoms of arsenic poisoning—Arsenic-eaters—Arsenic used for art purposes—Arsenic externally applied or inhaled—White arsenic—Poisoning by arsenic in acute form—Anomalous occurrences in arsenic poisoning—Poisoning by arsenic in chronic form—Similarity of arsenic poisoning to cholera—Recoveries from arsenic poisoning—Amount of arsenic found in liver—False charge of arsenic poisoning—Deaths from arsenic poisoning frequently recorded as cholera—Suicidal cases—Arsenic an indestructible poison—Trials for arsenic poisoning—Treatment in arsenic poisoning—Antidote for arsenic—Stimulants—Child-poisoning—Arrest of decomposition—Cattle poisoning—Statistics of cattle poisoning—Accidental deaths due to unrestricted sale of poisons—Fatal dose—Statistics of arsenic poisoning in Madras.

Three classes of poisons.

POISONS are divided into three classes, according to their mode of action on the system, *viz.*, Irritants, Narcotics, Narcotico-irritants. For the purposes of this book, however, it seems to be preferable to treat them as—(1) Mineral poisons, (2) Acids, (3) Vegetable poisons, and (4) Animal poisons.

Action of poison how modified.

625. There are various causes which may modify the action of a poison. The following table* represents the chief of these :—

I.—Quantity.	1. Quantity of the poison increases its rapidly fatal action. 2. Action changed by the size of the dose. Thus, oxalic acid in large doses acts as a corrosive; in small doses, on the heart, brain, or spinal cord.

* From HUSBAND'S *Forensic Medicine.*

II.—Form.	*Solubility* increases the activity of poisons. *Chemical combinations.* Baryta is poisonous, sulphate of baryta is inert. *Mixture.* Dilution may retard or accelerate the action of a poison.
III.—Point of application.	Skin, lungs, mucous, and serous membranes.
IV.—Condition of the body.	Habit—generally lessens the action of poisons. Idiosyncracy—increases or may lessen the action of poisons. Disease—generally lessens, but in some cases aggravates the action of poisons.

626. Irritant poisons belong, for the most part, to the mineral kingdom. A few are derived from the animal and vegetable kingdoms, but they are not often made use of for criminal purposes. The action of all irritant poisons is much the same; by irritating the stomach and intestines, they cause violent purging and vomiting, generally accompanied by intense pain in the abdomen, beginning and felt most at the epigastrium.* Many of these poisons possess corrosive properties, such as the mineral acids, caustic alkalies, corrosive sublimate, etc. The presence of these is generally at once detected in the act of swallowing, as there is an acrid and burning taste from the mouth and pharynx down the œsophagus to the stomach. Some irritants, however, do not possess any corrosive action, and some, such as arsenic, scarcely any taste. Irritant poisons.

The following Table† shows the points of difference in the action of Corrosive and Irritant Poisons. Difference between corrosive and irritant poisons.

CORROSIVES.	IRRITANTS.
1. Destruction of the parts to which they are applied. No remote action on the system.	1. Irritation of the parts to which they are applied producing inflammation. Remote action present in most of the irritants.

* "Pit of the stomach."

† *From* HUSBAND'S *Forensic Medicine.*

2. Symptoms supervene immediately they are swallowed, and consist of a burning, scalding pain felt in the mouth, gullet, and stomach.	2. Symptoms may rapidly supervene after they are taken, or some delay may occur, due to the state of concentration or delution of the poison. Pain in the stomach and bowels, more or less severe, is always present with the other signs of irritation.
3. Death may result from— (*a*) Shock. (*b*) Extensive destruction of the parts touched. (*c*) Starvation. (*d*) Suffocation, the result of œdema, or spasm due to acid in larynx.	3. Death may result from— (*a*) Shock. (*b*) Irritation causing convulsions. (*c*) Protracted suffering. (*d*) Starvation.
4. *Post-mortem* appearances: corrosion and extensive destruction of tissue.	4. *Post-mortem* appearances: irritation and signs of inflammation, ulceration, etc.

Diseases whose symptoms resemble irritant poisoning.

627. The following are the names of the diseases whose symptoms resemble the results of irritant poisons, together with such points of difference as may assist in distinguishing the one from the other :—

Irritant poison.

Irritant poison.—Symptoms of violent irritation in one or more portions of the alimentary canal. Pricking and burning of the tongue and mouth, and intense thirst, frequently accompanied with great constriction in the throat. Great abdominal pain and tenderness. Vomiting and purging are also usually present. The skin is hot and cold at intervals; the pulse small, frequent, and irregular. In the last stage the skin may become icy-cold. *An acrid, metallic, or burning taste in the mouth precedes the vomiting.* The vomit and alvine discharges are generally mixed with blood. Death occurs in from six hours to two days and a half.

Cholera.

Cholera.—Extreme and sudden prostration. The breath is cold to the hand in the last stages. The body is cold, shrivelled, and livid, or of a leaden hue. Vomiting and purging are present; the vomit is never bloody, while the

stools resemble rice-water. The thirst is intense, and in this particular alone resembles the effects of irritant poison. Death in from one to two days or even less.

English Cholera.—In this disease all the symptoms of irritant poisoning are present—pain in the belly and vomiting; but in this disease the vomit and alvine discharges are *never* bloody, most frequently bilious. *An acrid taste in the mouth and throat succeeds the vomiting.* This is due to the acrid nature of the vomited matters. The stools contain bile in English cholera; in irritant poisoning sometimes blood. Death is rare within three days. English Cholera.

*Gastritis**.—Acute gastritis is so rare in this country as scarcely to need description. Most of the cases recorded of acute gastritis have been found to be due to irritants. We must, therefore, consider the period and order of the occurrence of the symptoms in relation to the last meal. Costiveness of the bowels would point to the presence of gastritis or enteritis, while violent purging and vomiting would point to irritant poisoning. Gastritis.

Enteritis.†—Though more common than gastritis, enteritis is a rare disease. The bowels are generally *confined.* Tubercular and aphthous inflammation of the intestines may simulate irritant poisoning, especially chronic poisoning by arsenic. The *post-mortem* and a chemical analysis will reveal the true cause of death. Enteritis.

Peritonitis.—In the early stages of the disease vomiting is rare, and constipation is the rule, with marked tenderness over the whole abdomen. The morbid appearances in the peritoneum are seldom caused by irritants. Peretonitis.

Perforation of the Stomach.—The symptoms supervene immediately after a meal, the pain, which is very acute, gradually extending over the abdomen. In most cases the patient suffers for some time previously from dyspepsia. Perforation of the stomach.

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* *Gastritis* is inflammation of the stomach.

† *Enteritis* is inflammation of the intestines.

Hernia.

Hernia.—Examine the seat of pain, the cause will be soon detected. But an omental hernia may be present, giving rise to twisting pain at umbilicus. The *post-mortem* will decide.

Intussusception of the bowels.

Intussusception of the Bowels.*—Pain, sudden and confined to one spot below the stomach. Vomiting is present *without* purging, thus differing from diarrhœa and cholera. After a time the vomit becomes fæcal.

Colic.

Colic.—May be confounded with poisoning by the salts of lead. If lead be taken in large doses, it produces the symptoms of an irritant poison.

Statistics of cases of arsenic poisoning.

628. This is one of the commonest poison employed in this country. "During the year 1883 there were, in the Madras Presidency, thirty-one single, and fourteen multiple, cases of poisoning by arsenic, involving eighty-seven persons as against twenty-four single, and twelve multiple, cases in the preceding year. Of the eighty-seven persons affected, forty-nine were men, twenty-eight women, and ten children, of whom, twelve men, eight women, and six children died. Two of the cases seem to have been accidental and two suicidal. The largest quantity of arsenic proved to have been taken by any one person, *i.e.*, detected in such viscera and evacuations as were received for examination, was equivalent to 56·37 grains of arsenious oxide in a suicidal case; the smallest quantity estimated being 0·01 grains in a murder case. The average amount found was 3·7 grains. The duration of fatal cases was reported to have varied from less than one hour to two days. As usual, in a few cases, arsenic was found to have been administered, combined with preparation of mercury."

Attempts at poisoning by arsenic.

629. "There were also nine cases of detected attempts at poisoning by arsenic, making a total of fifty-four arseni-

* *Intussusception* is a condition in which a part of the intestine has passed for some distance into some other part and thus obstructing the passage of their contents and causing serious disease.—MAYNE'S *Medical Vocabulary*, 6th Ed., p. 210.

cal cases, against forty-three cases in the previous year." Two of these cases are of sufficient interest to merit special notice. One, which was sent up from Cuddapah, was remarkable for the speediness with which death occurred. The victim, a man in good health, was reported to have vomited three times, and to have died in convulsions within an hour after taking some suspected toddy. Orpiment was seen on the surface of the stomach, and found in abundance in some earth scraped up from where some of the suspected toddy was spilled." (This case, which was tried before Mr. Gribble, will be alluded to further on).

Case of Kimidi Maharani, poisoned with white arsenic.

630. "The other case is that of the *Kimidi Maharani.* White arsenic, finely ground, was given in a draught of some kind by the durbar physician. An informer communicated with the police just in time to prevent the cremation of the body. The stomach and a small piece of liver, with some pieces of soiled bedding, were forwarded for examination. From the viscera, the total amount of white arsenic extracted was seven-tenths of a grain. This quantity, though actually not very great, was relatively large, considering that it was extracted from but a small portion of the body of the deceased. A very large number of native medicines, stated to have been used by the physician during his treatment of the deceased, were submitted for examination. And for the defence it was alleged that red arsenic had been administered to the deceased for some days, and also aconite and veratria shortly before death occurred, and that death might therefore have been caused by the cumulative effect of the arsenic given medicinally, assisted by the medical doses of aconite and veratria. But no traces of aconite or veratria were detected in the stomach, and, moreover, no arsenic could be detected in the medicine alleged to contain red arsenic, and also if red arsenic had been administered, it would not have been converted in the body into white arsenic."—(*Chemical Examiner's Report for* 1883).

Common forms of arsenic.

631. Arsenic is most commonly met with in one of the three following forms :—

(1) White or common arsenic, arsenious oxide, arsenious acid, (As_2O_3). Toxicologically, this is the most important of the arsenical compounds and occurs either as a white powder or as a solid mass in a caked form having the superficial characters of enamel. It is colourless, or dull greyish white, and almost devoid of taste.

(2) Red arsenic, realgar, arsenious bisulphide, (As_2S_3).

(3) Yellow arsenic, orpiment,* King's yellow, arsenious sulphide, arsenious trisulphide, (As_2S_3).

Various forms of arsenic distinguished by color.

632. These three substances may readily be distinguished by their colors. Realgar and orpiment are both insoluble, though these preparations, as obtained in the bazaar, usually contain soluble arsenic; white arsenic is sparingly soluble in water. "Insoluble arsenic" may be taken to include realgar, orpiment, and certain other combinations (some *arsenites* and *arsenates)* of arsenic, which are insoluble in water. Soluble are much more poisonous than insoluble combinations.

White arsenic and arsenicum.

633. Ordinary white arsenic may be procured in almost every bazaar in India. Large quantities of it are imported from the Persian Gulf. LYON states that the Sale of Poisons Act appears to have the effect of reducing the sale of arsenic, especially in the Town of Bombay. The preparations of arsenicum supplied to dispensaries in India are *Liquor arsenicalis* "Fowler's solution," and Donovan's solution (Liquor arsenii et hydrargyri iodidi.

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* WADDELL mentions three fatal cases of poisoning by orpiment, and CHEVERS gives the details of two instances in which the poison was administered with the food. Orpiment is exceptionally used to procure abortion. Harvey relates the circumstances connected with such a case.

634. The chief legitimate uses to which arsenic is put to in India appear to be as follow :— *Legitimate uses of arsenic.*

(1) As a preservative agent, especially for wood.

(2) To prepare the thicker kinds of leather (CHEVERS); it is in more or less general use in curing skins.

(3) By goldsmiths in gold working.

(4) For the purpose of destroying rats and other vermin.

(5) Internally, for the cure of fevers and other diseases, and externally as a parasiticide and depilatory, etc.—(LYON's *Medical Jurisprudence for India*, 2nd ed., p. 147.)

635. In cases of criminal poisoning by arsenic, white arsenic (the "arsenic" of the shops in England) is almost invariably employed, and it is commonly administered in an undissolved state, as a powder mixed with articles of food. *Criminal poisoning by arsenic.*

636. The symptoms of poisoning by arsenic vary according to the form of the poison, "whether solid, vaporous, or soluble, according to the condition of bodily health of the person taking it, and according to the manner in which it is introduced into the animal economy, the condition of the stomach as to fulness or otherwise; whilst they are also in no small degree modified by individual peculiarities of organization and by habit, as, for instance, in the arsenic-eaters." (BLYTH). *Symptoms of arsenic poisoning.*

637. Arsenic-eaters are common in this country. Arsenic is regularly eaten by some persons, not only as an aphrodisiac, but also because it is supposed to add a portliness to the figure. We have seen a man consume as much as three grains a day for years. In some parts of the Punjab arsenic is eaten habitually by the people, either as an aphrodisiac or as an alternative to the use of opium. (CHEVERS). It is frequently given to horses to improve their condition. In Europe it is eaten by some of the *Arsenic-eaters.*

mountaineers in Lower Austria and Styria,* and Messrs. Maclagan and Rutter, who visited Styria in 1865, say that they have first measured and then seen men swallow doses of from five to six grains. On examining the urine of these persons, two hours afterwards, abundant evidence of its presence was found, but the men did not exhibit the slightest symptoms of poisoning. Arsenic proves fatal, whether taken externally or internally; and, in either case, traces of the poison are found in the stomach.

Arsenic used for art purposes.

638. Arsenic is largely used in the arts in the preparation of green and other colours, in dyeing and in calico printing. In consequence of the caustic properties of arsenious acid, it is occasionally used by quacks to effect the dispersion of cancerous tumours. The dangers associated with this practice need scarcely be insisted on.

Arsenic externally applied or inhaled.

639. If arsenic is applied externally, where the skin has been abraded, its action is more certain and immediate, but it has proved fatal where there has been no abrasion. A few years ago a large number of poisonings took place in England amongst children, owing to violet powder having been adulterated with arsenic, and TAYLOR mentions the case of a man who burnt arsenical pyrites at the door of a small room where seven children and an infant were sleeping. The children were removed and recovered. The infant was seized with diarrhœa and vomiting, and died in twenty-four hours. Cases of partial poisoning have also occurred from inhaling minute grains of arsenic, disseminated from a wall paper, in the manufacture of which arsenic had been used. As much as 27·53 grains of arsenious acid have been found in a square foot of a wall paper. In persons poisoned by arsenic externally applied, the poison leaves traces in the stomach similar to those caused by swallowing the poison. In experiments made upon dogs, where arsenic was applied to wounds, and the dogs were

* They take it under the impression that it increases the respiratory power.

prevented from licking it, death has occurred in a few hours, and the stomach has been found more highly inflamed than where a similar dose had been given internally. The stomach is one of the organs by means of which this poison is eliminated from the system.

640. In this country, the ordinary form in which it is used is as a white powder, and taken in this manner it has scarcely any taste. If mixed in large quantities, the food is said to acquire a roughness of taste. As a powder, arsenic can be purchased in almost every bazaar. In England, by an Act of Parliament (14 Vict. Cap. XIII, Sec. 3), it is ordered that arsenic sold in large quantities must be mixed with $\frac{1}{16}$th part of its weight of soot or $\frac{1}{32}$nd part of its weight of indigo, ten pounds being the smallest quantity allowed to be sold in the unadulterated form. **White arsenic.**

641. The *symptoms* of poisoning by arsenic in the acute form are almost exactly the same as those of cholera, and as, generally speaking, the poison is administered in doses far larger than is necessary to destroy life, it is the *acute* form which is most ordinarily met with. The rapidity and virulence of the symptoms are more or less modified by the form (*i.e.*, solution) and the quantity of the dose taken. From half-an-hour to an hour is the usual time which elapses before the symptoms of poisoning present themselves. In one case, when the poison was in solution, the symptoms came on immediately after it was swallowed; in another, after the lapse of ten hours. The patient first complains of a feeling of faintness and depression, followed with intense burning pain in the stomach, increased by the slightest pressure. Nausea and vomiting, the latter increased by the act of swallowing, now occur. The vomited matters may be dark-brown, black, or bilious; or they may be greenish, from the indigo mixed with the arsenic coming in contact with the yellow colouring matter of the bile. Blood may also be vomited. Purging, accompanied with straining at stool and cramps in the calves of **Poisoning by arsenic in acute form.**

the legs, may occur; the purging, like the vomiting, being incessant, and affording no relief to the sufferer. The thirst is intense, the pulse feeble and irregular, and the skin cold and clammy. The urine may or may not be suppressed. As a rule, the symptoms in this form of poisoning are *continuous*; but cases occur in which there are distinct *remissions*, and even *intermissions*. Coma, paralysis, or tetanic convulsions, may supervene before death closes the scene.

Anomalous occurrences in arsenic poisoning.

642. The pain may be absent or but slight. Vomiting and purging do not occur in all cases, nor is thirst, a most persistent symptom, always present. In some cases the symptoms resemble those which accompany an attack of cholera. In others, signs of collapse first make their appearance, from which the patient may rally or he may die outright. These variations in the symptoms do not appear to be due to the *form* or *quantity* of the poison taken. It should also be remembered that arsenic may produce symptoms closely resembling those the result of *narcotic poisoning*.

Poisoning by arsenic in chronic form.

643. The symptoms are not so well pronounced in the *chronic* as in acute poisoning. The eyes become inflamed and watery. The skin may be irritable, and in some cases patches of a vesicular eruption ("eczema arsenicale") appear. Dr. Prosper de Pietra Santa describes a disease to which workers in manufactories of paper coloured with Schweinfurt-green are liable, characterised by the appearance of vesicles, pustules, "*plaques muquenses,*" and ulcerations on the exposed parts or the body, fingers, toes, and scrotum. Arsenical poisoning has been mistaken for nettle-rash and scarlet fever. Paralysis, more or less general, is not of unfrequent occurrence. The sufferer emaciates, the hair falls off, and he dies from exhaustion. The tongue in some cases is excoriated, and salivation is also present, fœtor of the breath being well marked. Jaundice has also been noticed in some cases. The symptoms of this form of poisoning are frequently so misleading

that death due to the action of arsenic has been referred to "spontaneous inflammation of the bowels."*

644. The vomiting and purging (the stools sometimes having the character of cholera dejecta, that is, "rice-watery") in the acute form of arsenical poisoning, together with the small, feeble pulse, coldness of the extremities and tendency to sink into collapse, give this form of poisoning a very special toxicological interest in India, from the similarity which these symptoms bear to cholera in its malignant form. Death generally occurs within 20 hours after the taking of the poison. One of the most rapidly fatal cases on record is that mentioned by the late Dr. Rogers (of Madras) in the extract given elsewhere. In this case the poison was given in some toddy, at about sunset in the middle of the year. The deceased had to walk about a mile to reach his home, was seized with vomiting on the way, and almost immediately on arrival at his house fell into a state of collapse. He vomited three times, and died before seven o'clock the same evening, so that death must have taken place within an hour from the time when the poison was administered. The amount of arsenic found in the viscera was $1\frac{1}{4}$ grains, and in the vomited matter $\frac{14}{1000}$ of a grain. In the earth which had been scraped up from where the liquor had been spilled, seventeen grains were discovered! It is, therefore, probable that only a small portion of the vomited matter was sent for examination, or that the greater portion of the dose had been vomited out before he reached home. An even still more rapid case is mentioned by Dr. VanGeyzel in his annual report for 1888 as having occurred at Hyderabad. "A nautch girl was treated to a glass of brandy and subsequently to some other liquor. In a few minutes she fell back insensible and died almost immediately. Arsenic was found in the viscera. The absence of any gastro-intestinal symptoms is a noteworthy feature of this case, and it appears to be an example of an uncommon form of arsenical poisoning, in

Similarity of arsenic poisoning to cholera.

* HUSBAND'S *Forensic Medicine.*

which the nervous system is affected, the subject becoming comatosed as in opium poisoning." Where a large dose like this is given, which takes an immediate effect, generally far less arsenic is found in the stomach and viscera than in the case of a smaller one. In the same way, since the absorbed arsenic is passed out of the system by the urine, and the unabsorbed is evacuated by the bowels or vomit, if repeated small doses have been given over a considerable number of days, only a very small trace may be found after death. The fact of a small quantity being found in the body, which, under ordinary circumstances, would not be a fatal dose, cannot be taken as a presumption that death was not due to the arsenic. All that can be said is, that the arsenic found in the body after death is all that remains of the dose given.

Recoveries from arsenic posioning.

645. Cases often occur in which, from the examination of the vomited matter, it is clear that a large dose must have been given; but, strange to say, the persons affected recover. Early in 1884, at one sessions at Cuddapah, there were three cases of poisoning by arsenic. In one case the poison was given to two children, in another to an adult, and these three recovered. The remaining case proved fatal. In both the cases where there were recoveries a similar antidote had been given. This was described as being a mixture of the juice of the red cotton flower (in which two three-pice pieces had been placed) and cow-dung. In another case it was human excrement that was mixed instead of cow-dung, the other ingredients being the same. In the case that proved fatal, no antidote had been given. It is peculiar that in both the cases where this antidote was given there was a recovery, since it is impossible to suppose that, except as an emetic, it could have been of much use, though the copper coins would, to a certain extent, act as an antidote, for dissolved arsenic would be precipitated on copper.

Amount of arsenic found in liver.

646. With regard to arsenic, the following table, taken from TAYLOR, is of importance, as showing the amount

of arsenic which may be found in the liver at certain intervals :—*

After taking the poison.	Total weight of arsenic.
In 5½ to 7 hours	0·8 grains.
„ 8¾ „	1·2 „
„ 15 „	2·0 „
„ 17 to 20 „	1·3 „
„ 10½ days	1·5 „
„ 14 „	0·17 „
„ 17 „	*nil.*

647. In cases, however, where there is a recovery from what, by examination, appears to have been a large dose of arsenic, great caution should be used so as to prevent the possibility of a false charge being established. There can be little doubt that the value which is attached to the chemical examiner's certificate is getting widely known, and the manner in which this valuable evidence is obtained gives an opening to a false charge, which has all the appearance of being true, because backed up by unimpeachable evidence. In 1884 a woman was charged with having come into her neighbour's house and mixed arsenic with his food. The man had formerly been on terms of intimacy with her, which he had broken off on his marriage with a young wife. The prisoner, in her defence, said, that subsequent to the marriage, he had continued, or had proposed to continue, the intimacy. The accusation was, that the woman had come into the house whilst the rice was being cooked, had sat down near it, had lifted the lid, and stirred the contents with her finger. Soon afterwards she went away. As soon as the husband ate the rice, he was seized with vomiting. As is customary in this country, the husband ate first, but he was attacked before any one else ate the food, and therefore the dose was probably a large one. He was taken to the village *choultry*, where he vomited several times, the vomit being preserved in an ordinary

False charge of arsenic poisoning.

*According to Taylor, poisons may be temporarily deposited in the iver, kidneys, suture, heart, lungs, muscles, brain, fat, and bones.

pot. Next day he recovered. In the vomited matter, some six grains of arsenic were discovered. There were several witnesses who spoke to the prisoner having meddled with the cooking pot, and there were other suspicious circumstances against her. She was convicted of an attempt to commit murder and the conviction was upheld. The woman was undefended, but if she had been defended, a strong case might have been made out on the possibility of a false complaint. The intimacy would cut both ways. It *might* either be a reason for the prisoner to try and get rid of the young wife, or it *might* be a reason for the wife to get rid of the prisoner. If the whole thing had been a deep-laid plot, the prisoner *might* have been asked into the house, an ordinary emetic *might* have been mixed with the food after she had gone, and then, when the husband began to vomit, some arsenic *might* have been mixed with the vomited matter by the wife or her friends. There would then have been a whole chain of evidence complete, backed up by the chemical examiner's certificate. In this case I have no doubt that the prisoner was rightly convicted, but in a country like India, where the people are so ingenious in the fabrication of false charges, there is always the possibility of such a charge being fabricated, and great caution should therefore be shown in narrowly testing the evidence. CHEVERS gives a somewhat similar case in which the charge was probably false:—"Many years ago, Mr. Macleod Wylie related to me the following case as an illustration of the difficulty which is often experienced in fathoming crime in India. Two Bengalees, say T. and S., were always quarrelling and getting up law-suits against each other. S. was sent to jail. It was then given out that peace had been made between them. T. visits S. at his request, and brings him a present of sweetmeats from Kali Ghât. S. gives the alarm that he has been poisoned, is seen vomiting into a vessel, the contents of which are sent to Dr. O'Shaughnessy, the chemical examiner, who reports that the vessel contained enough of white arsenic to poison a

horse. On further investigation, the chemical examiner said, that it was by no means certain that the poison had ever been in the stomach of S." We are not told what the reasons of the chemical examiner's opinion were, but the case is important and deserves attention.

648. There appears to be no doubt as to the similarity of the symptons of some cases of poisoning by arsenic and of cholera, and it is quite possible that during epidemics of the latter disease in large towns some of the cases recorded as deaths from cholera are in reality cases of arsenical poisoning, hence the necessity of having the cause of death certified to by a medical practitioner. We need scarcely comment here on the facilities for secret poisoning being carried out in *zenanas* in which medico-legal investigations are always difficult. Deaths from arsenic poisoning frequently recorded as cholera.

649. It has generally been noticed that, in the case of suicides, a far larger dose is taken than when the poison is given with a homicidal intent. This was a great argument in favour of *Madeline Smith* in the Great Glasgow Poisoning Case. In this case 88 grains of arsenic were found in the stomach of the deceased, *L'Angelier,* and it was argued that a man could scarcely have taken so large a dose unknowingly, and that therefore the death had been one of suicide. Taylor, however, remarks, that Christison "has set this question at rest, by the publication of a case in which a man was homicidally destroyed by arsenic, and the quantity found in the stomach after death was from 90 to 100 grains." This would amount to half a teaspoonful. In Reg. *v.* Dodds* and Reg. *v.* Hewitt—both charges of homicide—as much as 150 and 154 grains, respectively, were found in the stomachs of the deceased. Suicidal cases.

650. As arsenic is an indestructible poison, it may be found in the body after many years. In one case it was detected after the lapse of fourteen years. Arsenic has Arsenic an indestructible poison.

* The arsenic in this case was administered in whisky-punch sweetened and kept in suspension by constant stirring.

the power, to a certain extent, of arresting putrefactive changes; the stomach may, therefore, be found well preserved, and with the signs of inflammatory action present after the lapse of many months and after putrefaction has far advanced in other parts of the body. When a person is suspected to have been poisoned with arsenic, and nothing but the skeleton is left for investigation, the arsenic should be looked for especially in the bones of the pelvis and the neighbouring spinal vertebræ. (*Watt's Dic. Chem., Sup.*).

Trials for arsenic poison.

651. In trials for arsenical poisoning, where an exhumation has been made, the question may arise whether the arsenic found in the body has been carried into it from the earth surrounding the body. In reply, the following points should be kept in mind:—

(1) Arsenic may occur in certain calcareous and ochrey soils.

(2) In these soils no arsenical compound *soluble in water* has been found.

(3) The arsenic of these soils is dissolved out by hydrochloric acid, proving their previous insolubility.

(4) The arsenic is, therefore, probably in the form of an arsenite or arseniate of iron, lime, etc.

(5) Careful experiments have rendered it evident that, even under the most favourable circumstances, the dead human body does not acquire an impregnation of arsenic from contact with arsenical earth. (TAYLOR).

Treatment in arsenic poisoning.

652. Emetic of apomorphine given hypodermically (five minims of the British Pharmacopœial solution), or mustard, a table-spoonful of the powder in water, or 20 grains of sulphate of zinc. The emetic should be followed by some pints of hot greasy water to wash out the stomach.

653. The *antidote* for arsenic is ferric hydrate, because it has the power of at once converting the soluble arsenic into insoluble ferric arseniate. The ferric hydrate, should, however, have been recently prepared or else it loses its effect. It is also only efficacious when immediately given, because it will only act when it comes in contact with the arsenious acid, "and when once the poison has been removed from the stomach, by absorption into the tissues, the administration of the hydrate becomes absolutely useless. Ferric hydrate may be readily prepared, by adding strong ammonia to the solution, or tincture of ferric chloride, found in every chemist's shop, care being taken to add no caustic excess of ammonia; the liquid need not be filtered but at once administered." (BLYTH). Solution of carbonate of sodium may be used instead of the ammonia. An ounce dose of dialysed iron given repeatedly also answers well. *Magnesia* may be given if iron is not available. Antidote for arsenic.

654. *Stimulants* are to be given freely if there be much prostration. *Mucilaginous drinks,* such as barley water, linseed tea, or white of egg, are soothing to the inflamed stomach. Keep the patient warm, and when the violent symptoms have abated, apply a linseed meal poultice to stomach, and give a hypodermic solution of one-third of a grain of morphine. Stimulants.

655. Cases frequently occur in which arsenic is administered to children owing to some neighbour wishing to wreak a spite against their parents. A case of this kind was tried at one of the Cuddapah sessions in 1883. Two neighbours, a man and a woman, were quarrelling, owing to a cock, belonging to the latter, having strayed into the former's yard. They made use of very foul language, and soon afterwards the man went out to work. During the day the man's two children were playing outside the house, and the woman called one of them into her hut and gave him a ball of jaggery, which he came out eating. Very Child-poisoning.

soon afterwards he was seized with the usual symptoms and died in about four hours. Arsenic was found in the stomach, and arsenic was also found in the woman's house. In this case one of the assessors gave it as his opinion that the prisoner was not guilty, and, on being asked for his reason, said there was not sufficient evidence of the *cause* of death. As to how he accounted for the arsenic being found in the child's stomach, his reply was: "God only knows how it came there!" The woman was convicted and the sentence was upheld. A similar case was reported from Rajahmundry in August, 1884. A boy, three years of age, was left in good health in the morning by his parents. In the evening he vomited twice and died. The parents suspected that he had been poisoned during their absence by a neighbour, and although the *punchayet* gave a unanimous verdict that the child had died of a disease called "Balapapa Chinna," the magistrate directed the viscera to be forwarded to the chemical examiner. A considerable quantity of white arsenic was found in the stomach.

Arrest of decomposition.

656. It has often been noticed, both in Europe and in India, that in cases of poisoning by arsenic, the stomach resists the progress of decomposition even long after all other portions of the body have yielded to it. CHEVERS mentions one case in which arsenic was found in two bodies after ten months' interment without coffins.

Cattle-poisoning.

657. *Cattle poisoning*, by arsenic, is a crime of frequent occurrence, and is generally practised by the chucklers, *chamars*, or *dhers*, who are entitled to the skins of all animals that die in the village. During the year 1883, Dr. Rogers says that sixty-three cases, involving seventy-four deaths, were sent to him for examination. In forty of these cases poison was found, and in thirty-nine cases the poison was arsenious oxide. There were besides sixteen cases in which poison was suspected, and in the food forwarded for examination. In thirteen of these, arsenious oxide was found, and in one arsenious oxide mixed with mercuric

salt. Where there is reason to suppose that this crime is being practised, it has been effectually stopped by ordering that all bodies of deceased cattle be buried in a mixture of quicklime and sand. This destroys the skin, and the *chucklers,** having no longer any thing to gain, discontinue the practice. Cattle-poisoning is often had recourse to from feelings of spite and enmity. The crime seems to be equally prevalent all over India, and from year to year it is probable that increased detection will go to swell the figures, until it is finally put a stop to. At present, increase of the figures does not argue an increase of the crime, because it is probable that many cases of cattle-poisoning are unreported.† To obviate the possibility of such a crime in cavalry regiments in India, an experienced veterinarian informs us that the hides of all animals dying within the regimental lines should be cut into small fragments. LYON states that in the year 1884, 288 cases of cattle poisoning were reported in India by the various chemical examiners. In Bombay, 277 animals, almost all horned cattle, were killed by poison during the ten years 1875—1884.

658. The following table shows the number of cattle-poisoning cases in Madras for the five years 1885-1889 :— Statistics of cattle poisoning.

	Number of cases in which poison was detected.	Numbers of deaths reported.
Arsenical	283	292
Mercurial	2	2
Calatropis Gigante	6	6
Cocculus Indicus	2	2
Total ...	293	302

* Cobblers.

† In the North-Western Provinces many cattle are poisoned by a decoction made from the wild liquorice seed. See accounts in the *Agriculturist*.

Accidental deaths due to unrestricted sale of poisons.

659. Deaths from arsênic-poisoning frequently occur from mistake, and it is a matter for surprise that such cases are not of more frequent occurrence. There is no restriction in the Madras Presidency on the sale of poisons, and any person can buy as much as he likes without a question being asked him. Native drug-sellers are in the habit of keeping their medicines without any labels or distinguishing marks; and when we find that, in spite of all the precautions which the law in England and in Europe lays down, mistakes are of by no means of rare occurrence, it would seem high time that some legislative enactment should be introduced. It has been found possible to check the sale of saltpetre and opium, and the books of the traders contain a full record of all sales. Various writers in India have frequently urged that a similar restriction should be put upon the sales of poisons, and especially of arsenic, which is so readily obtainable. The public press has advocated the same thing over and over again, but up to the present time nothing has been done. A law, similar to that in England, is required, under which all sales can be traced, and when arsenic is sold in large quantities for purposes of trade, it should be mixed either with soot or with indigo. It may be mentioned that in this matter the Government of Hyderabad has set a laudable example to the rest of India, for in 1890 an order was passed by the Judicial Secretary regulating the sale of poisons. No report is as yet available regarding the way these rules have worked.

Fatal dose.

660. The quantity of arsenic required for a fatal dose is estimated by TAYLOR, at from *two* to *three* grains. The smallest quantity proved to have been taken was two grains. GUY says that recoveries have taken place from doses of half an ounce. It will largely depend upon the condition of fulness or emptiness of the stomach at the time the poison is taken, and also upon the vehicle in which the poison is administered. As mentioned before, it must always be remembered that the amount found in the body

is no test of the dose taken. It is only a proof of what remains in the body. When the dose is large, vomiting and purging come on early and get rid of much of the arsenic before its fatal action is produced. The fatal period varies from 20 minutes to 2 or 3 weeks and even later from the secondary effects of the poison. Any thick vehicle will delay the action of the poison.

661. The following table shows the statistics of cases of arsenical poisoning in Madras for the five years 1885-1889:— Statistics of arsenic poisoning in Madras.

	Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of deaths reported.
1885	35	17	20
1886	46	19	20
1887	37	18	18
1888	28	17	18
1889	33	18	20
Total...	179	89	96

For arsenic poisoning consult cases of :—
Madeline Smith, Lattsome Browne; *Trials for murder by poisoning*, p. 295.

CHAPTER III.

ANTIMONY AND OTHER METALLIC POISONS.

Antimony—Symptoms of acute antimonial poisoning—Symptoms of chronic antimonial poisoning—Antidotes for antimonial poisoning—Medicinal uses of antimony—English cases of antimonial poisoning—Mercury—Symptoms of acute mercurial poisoning—Symptoms of chronic mercurial poisoning—Antidotes for mercurial poisoning—Medicinal uses of mercury—List of patent medicines containing mercury—Statistics of mercurial poisoning—Symptoms of acute copper poisoning—Symptoms of chronic copper poisoning—Country arrack contains copper—Lead, zinc, and iron as poisons rarely used.

Antimony.

ANTIMONY is a poison which appears to be seldom used in this country, though occasionally cases occur in which the poison has been taken in the form of *tartar-emetic*. This occurs in the form of a white powder, sometimes having a tinge of yellow. The antimonial wine of the British Pharmacopœia contains two grains of tartar-emetic to the ounce. CHEVERS only mentions three cases, all of which appear to have been accidental.

Symptoms of acute antimonial poisoning.

662. Antimonial poisoning occurs in both the acute and chronic forms. The clinical history of the acute variety is as follows:—Tartar-emetic is an irritant poison, but possesses light corrosive properties. When taken in large doses of two or three drachms, it gives rise to a metallic taste in the mouth, which is not easily removed. In most cases, violent vomiting follows immediately after the poison is swallowed, the vomiting continuing even after the stomach is emptied of its contents. Burning pain is felt at the pit of the stomach, accompanied with cramps in the belly, and purging. There is considerable difficulty in swallowing, and the patient complains of tightness and constriction in the throat. The mouth and throat in some cases are excoriated or covered with whitish aphthous-looking spots, which ultimately become brown or black. In some cases,

the thirst is intense; in others, absent or nearly so: Cramps in the lower extremities, almost amounting in some cases to tetanic spasms, followed by extreme depression, are generally the precursor of a fatal termination. The urine is not suppressed, as is the case in arsenical poisoning; in some cases it has even been increased. On this point, however, the statements of observers differ. Trousseau says that the urine is suppressed; Hussmann that it *never* is suppressed. The skin is in some cases covered by a pustular eruption, not unlike that of small-pox. Even in the most desperate cases of antimonial poisoning, there is always greater hope of recovery than in arsenical poisoning.

663. The clinical history of the chronic variety is as follows:—The symptoms which mark the *chronic* form of poisoning differ chiefly in being less intense and less rapid than in the acute. Chronic poisoning by small doses is that form of poisoning which appears most in vogue of late years in England but is rarely met with in India. The unfortunate victim complains of constant nausea and retching, with great depression. Food is objected to, as it only increases the vomiting. The matters vomited are at first merely mucus, but after a time they become mixed with bile. Each time the poison is repeated the symptoms become aggravated. Emaciation gradually sets in, and the persons dies from complete exhaustion or from the effects of a larger dose than usual. In all doubtful cases the urine should be examined.*

Symptoms of chronic antimonial poisoning.

664. The *antidotes* are—any infusion containing tannin, such as decoctions of tea, oak-bark, etc., for the salt which has been expelled by vomiting may in this way be decomposed and rendered harmless (BLYTH). The treatment of acute poisoning, which has proved most successful, has been encouraging vomiting by tickling the fauces, giving

Antidotes for antimonial poisoning.

* HUSBAND'S *Forensic Medicine.*

strong green tea and stimulants. If the stomach has not been emptied by vomiting, use the stomach-pump, or give a hypodermic injection of one-fifth of a grain of apomorphine. Follow this with large quantities of strong tea, or give half a drachm of tannin or gallic acid in warm water. Give also demulcent drinks and stimulants in small doses, frequently repeated. Keep the patient warm by hot blankets and wraps. The interrupted galvanic current to the heart may be useful (BLYTH). Give a hypodermic injection of one-third of a grain of morphine when the acute symptoms have subsided.

Medicinal uses of antimony.

665. Antimony is used in large doses in veterinary practice, as much as 90 grains of tartar-emetic being often administered to a horse in his gruel three times a day. It is supposed to be fattening. Medicinally, it is employed as a vascular depressant, diaphoretic, and expectorant. Tartar-emetic is given in doses varying from one-sixteenth to one-eighth of a grain, and as an emetic from one to two or three grains. It should never be used as an emetic in suspected poisoning, as its presence would confuse the investigation. Therefore, in a trial for poisoning by antimony, care should be taken to find out whether tartar-emetic had not possibly been given medicinally.

English cases of antimonial poisoning.

666. The leading English cases for poisoning by antimony are those of Dr. Pritchard, Dr. Smethurst, and Thomas Winslow; a small portion of antimony was also found in the body of Cook in the famous *Palmer* case, but in this case the jury found the prisoner, Palmer, guilty of having caused death by administering strychnine. The Bravo case, with its appalling miscarriage of justice, is still fresh in our memory.

Mercury.

667. During 1883 "mercurial compounds were detected in the forms of corrosive sublimate, calomel, and cinnabar" (Madras Chemical Examiner's Report for 1883). There were four cases of mercuric salt and one of calomel. Mercury is also occasionally mixed with other poisons.

CHEVERS says, that cases of poisoning "by those medicinal preparations of mercury which are common in India—as by *red sulphuret* (factitious cinnabar), *hingool* (vermilion), *shengerf-darshikna*, similar to corrosive sublimate, and by *rascapur*, a mixture of calomel and corrosive sublimate, are not likely to call very frequently for the opinion of the medical witness." The last named preparation of mercury is frequently administered by the *kobaraj* * in large and small poisonous doses to the unfortunate sufferer who consults him. It is no uncommon thing to find a considerable portion of the lower jaw necrosed,† the tongue swollen, the gums ulcerated, and the entire buccal‡ cavity excoriated, from the effects of the wholesale exhibition of this powerful salt of mercury. Perfectly pure mercury, if taken into the stomach, is considered to be non-poisonous, and as much as a pound or more has been taken without injury. The poison acts most fatally when inhaled as a vapour, or in a finely-divided form when rubbed into the skin. Leiplinger records a case in which three persons were found dead in bed ; the day before they had rubbed into the body, for the purpose of curing the itch, a salve containing 270 grammes of mercury, finely divided.

668. The *symptoms* may occur in either the acute or chronic form. In the *acute* variety of mercurial poisoning the symptoms come on almost immediately the poison is swallowed. A strong metallic coppery taste in the mouth is experienced and a choking sensation in the throat. Pain of a burning character is felt, extending from the mouth to the stomach. Nausea and vomiting of stringy mucus, more or less tinged with blood, accompanied with violent purging, the evacuations being also mixed with blood and mucus. The pulse is feeble, quick, and irregular ; the countenance flushed or pale, and the tongue white and shrivelled. (This appearance of the tongue is not present in all cases.) The skin is cold and clammy, and the functions of the kidneys

Symptoms of acute mercurial poisoning.

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* Native empirics. † Dead.

‡ *Buccal* means appertaining to the jaw.

are arrested, there being in many cases complete suppression of urine. As is the case with other irritant poisons, the symptoms and effects produced admit of considerable variation. Thus, there may be no pain in the stomach and no purging. Salivation is present in some cases, but chiefly in those in whom the fatal termination is somewhat prolonged. This sign is not infrequently absent. Poisoning with corrosive sublimate differs from arsenical poisoning in the following particulars :—Corrosive sublimate has a distinct metallic taste, arsenic is almost tasteless ; the symptoms in the former supervene immediately the poison is swallowed, in the latter there is a short delay. The discharges in corrosive sublimate are more frequently bloody than in arsenic poisoning.

Symptoms of chronic mercurial poisoning

669. The symptoms present in the *chronic* form of mercurial poisoning are modified by the size of the dose, and the interval allowed to elapse between each dose. Nausea, followed occasionally by vomiting and pains in the stomach, is complained of. There is general constitutional disturbance and consequent mental depression. Salivation, as might be expected, is a more prominent symptom than in acute poisoning ; but the salivation may be intermittent, that is, it may cease and then reappear, even after the lapse of months, without an additional dose of mercury having been given in the interval. Salivation may also come on in the course of certain diseases, attacking the salivary glands, and it may also be produced by other causes—pregnancy, etc. The glands of the mouth become swollen and painful, the gums tender, the teeth become loose and fall out of the mouth. The breath has a peculiar offensive smell. The bowels are irritable, and diarrhœa is not infrequently present. The nervous system is more or less affected, neuralgic pains and mercurial tremors being present in many cases. (Also occur occasionally in those exposed to the vapour of mercury.)* There is also nausea and vomiting,

* HUSBAND'S *Forensic Medicine.*

pain in the stomach, and diarrhœa alternating with constipation. Mercurial tremor may follow, or accompany the above state, affecting all the limbs, the face, and the muscles. This deepens into paralysis, and the patient dies from exhaustion. In 1810 a remarkable case occurred on board H.M.S. *Warrior.* A Spanish ship, laden with mercury, had been wrecked on the Coast, and the British sailors saved from her some 130 tons of mercury. This was stored in the hold, but the skins in which it was packed, rotted, and several tons of mercury escaped and were diffused through the ship as vapour. In three weeks two hundred men were affected with ptyalism, ulceration of the mouth, partial paralysis, and, in many instances, with diarrhœa. All the stock died—mice, cats, a dog, and even a canary. Three men were attacked with pulmonary disease. One got confirmed *phthisis pulmonalis,* or "consumption," two died from gangrene of the cheeks and tongue, and one woman, confined to bed with a fractured limb, lost two of her teeth, and many exfoliations of the jaw took place. It must be borne in mind that in certain diseases—granular disease of the kidney—the smallest dose of any mercurial preparation may produce profuse ptyalism. Further, the toxicologist must be careful not to mistake the affection known as *cancrum oris,* or 'the canker,' which is most common in delicate, ill-fed children and adults, for the effects of mercury.

670. The *antidote,* as given by Blyth, is as follows: Empty the stomach by the tube or pump, and wash the organ out with plenty of white of egg dissolved in water and milk. If the stomach-pump is not at hand, then give emetics, such as the solution of apomorphine (five minims of the British Pharmacopœial solution) hypodermically, or a zinc sulphate emetic, or mustard, or ipecacuanha. Probably violent vomiting is already present, then stomach tube or emetics are unnecessary; but in any case give plenty of albuminous fluids, such as white of egg, in water and milk. If neither of these is at hand, chop any fresh

Antidotes for mercurial poisoning.

meat up as finely as possible in a short space of time, diffuse in water, and administer. Follow up with demulcent drinks, such as barley water, flour and water, etc.

Medicinal uses of mercury.

671. Pain may be allayed with a little opium or morphine. (One-third grain given hypodermically). Stimulants are admissible, if necessary.

List of patent medicines containing mercury.

672. Mercury occurs in the following patent and quack medicines: *Mordant Norton's drops, Solomon's anti-impetigines, Poor Man's friend, Brown's lozenges, Cluny's worm lozenges, Storey's worm cakes, Wright's pearl ointment, Keyser's pills, Mitchell's pills,* also in many antibilious pills.

Statistics of mercurial poisoning.

673. The following are the statistics of cases of poisoning by mercury during the five years 1885-1889:—

	Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of deaths reported.
1885	7	2	2
1886	4	1	1
1887	9	5	5
1888	5	3	3
1889	10	5	5
Total...	35	16	16

774. In all cases of suspected deaths by mercury, too much stress should not be laid upon the detection of mercury in the body, for, as TAYLOR says, "nothing is more common than to discover traces of mercury in the stomach, bowels, liver, kidneys, or other organs of a dead body."

Copper Poisoning.

Symptoms of acute copper poisoning.

675. Copper poisoning may be met with in either the acute or chronic form. In the *acute* variety of copper poisoning by the sulphate, the primary action in from five to

fifteen grain doses is that of a quick emetic, while in larger doses it is a powerful irritant; but when absorbed, it appears to act chiefly on the brain and nervous system. Its irritant action is marked by nausea, vomiting, griping pain in the belly, which is greatly distended, and increased flow of saliva. The vomited matters are of a bluish or greenish colour, and the discharges from the bowels are greenish and contain blood. The above-mentioned symptoms usually follow immediately after the poison is swallowed and rapidly increase in severity. After a time the remote effects supervene, marked by headache, giddiness, laboured breathing, quick, irregular pulse, coma or convulsions, paralysis, and death. In poisoning by this substance the convulsions are most violent and wild incoherent delirium not infrequent. The *subacetate of copper* or *verdigris* produces symptoms not unlike those just described. Jaundice and suppression of urine may result when either this or the sulphate is taken. It should be remembered that verdigris forms one of the bazar antidotes for arsenical poisoning.

Symptoms of chronic copper poisoning.

676. In the chronic form of copper poisoning there is a constant and troublesome irritation of the stomach and bowels; vomiting and purging, attended with considerable straining at stool; loss of appetite, loss of power, and general emaciation sets in. The patient is subject to frequent trembling of the limbs, which may end in paralysis. The mouth is unpleasant, and a coppery metallic taste is experienced. Cramps or colicky pains in the belly are not infrequent. Jaundice is sometimes present. The vomited matters are greenish; but the practitioner must not be led away, and thus mistake the colour of the vomited matters which occur in some morbid states associated with biliary vomiting, for that is the result of poisoning by a salt of copper. A form of chronic poisoning affecting workers in this metal has been described by some French pathologists as 'copper-colic.' A cachectic condition of the system, accompanied with one or more of the symp-

toms already detailed, marks this form of poisoning. A *purple* line along the margins of the gums is present in some cases.

Country arrack contains copper.

677. It should be remembered that all country arrack contains a trace of copper from the worm of the still. This should be borne in mind when search is being made in cases of suspected poisoning, otherwise a suspicion might be raised that copper had been used as a poison, whereas, in reality, its presence may only be due to arrack. Under recent orders on this subject, every medical officer is expected to have a supply of *rectified spirit* for preserving viscera, etc. in medico-legal cases, and in the event of his being obliged to use country spirit for the purpose, he is required, before using such spirit, to ascertain that the spirit does not contain copper, by a simple test proposed by the chemical examiner, and he is obliged to certify that he has tested the spirit according to these directions and found it copper-free.

Lead, zinc, and iron as poisons rarely used.

678. Lead, zinc, and iron are so rarely used in this country as poisons, that for the purposes of this book there seems to be no necessity to allude to them.

679. The following table shows the number of cases of poisoning by copper during the five years 1885—1889 :—

	Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of deaths reported.
1885	...	...	...
1886	...	...	...
1887	1	...	...
1888	1	...	...
1889	...	...	...
Total...	2	...	...

CHAPTER IV.

ACIDS AND ALKALIES.

Sulphuric acid poisoning—Quantity of sulphuric acid required for fatal dose—Symptoms of sulphuric acid poisoning—Treatment in sulphuric acid poisoning—Hydrochloric acid poisoning—Nitric acid poisoning—Ammonia poisoning—Symptoms of ammonia poisoning—Treatment and antidote in ammonia poisoning—Caustic potash, soda, potassium, etc.—Volatile acids, petroleum, etc.—Camphor poisoning—Symptoms of camphor poisoning—Treatment and antidotes for camphor poisoning—Alcohol poisoning—Ether, chloroform, and chloral poisoning—Carbolic acid poisoning—Symptoms of carbolic acid poisoning—Fatal dose of Carbolic acid—Case of carbolic acid poisoning—Treatment and antidote in carbolic acid poisoning—Prussic acid poisoning—Case of prussic acid poisoning—Fatal dose of prussic acid—Treatment and antidote for prussic acid poisoning—*Post-mortem* appearances in prussic acid poisoning.

Sulphuric acid poisoning.

SULPHURIC *acid* occurs very rarely in poisoning cases in this country. MOUAT only met with one case, in which sweetmeats had been the means used to administer the poison. CHEVERS appears also to have met with one case only, that of a young woman who had swallowed a mouthful, but states that several cases have occurred in Calcutta, though without mentioning details. Sulphuric acid is often used in the houses of Europeans in the mofussil, for filling ice machines, and cases might therefore occur. One case was actually reported in 1889.

Quantity of sulphuric acid required for fatal dose.

680. The quantity of sulphuric acid required for a fatal dose is not accurately known. The smallest dose on record which has proved fatal is quoted by CHRISTISON, *viz.*, sixty drops, and TAYLOR records the case of a child that was killed by a dose of twenty drops. BLYTH says, that if it were asked in a court of law what dose of concentrated sulphuric acid would be dangerous, the proper answer would be: So small a quantity as from two to three

drops of the strong undiluted acid might cause death, more especially if conveyed to the back of the throat; and adds, that it may be laid down, that all quantities, even the smallest, of the strong undiluted acid, come under the head of hurtful, noxious, and injurious.

Symptoms of sulphuric acid poisoning.

681. Sulphuric acid is sometimes used criminally to cause disfiguring burns on the face. Its external effects are not widely different from those attending scalds or burns from hot neutral fluids. There is a destruction of tissue, not necessarily deep, for the acid is immediately wiped off; but if any should reach the eye, inflammation, so acute as to lead to blindness, is the probable consequence. The skin is coloured at first white, at a later period brown, and part of it may be, as it were, dissolved. The internal effects are immediate and acute. The pain, however, is not constant, since in a few recorded cases, no complaint of pain has been made; but these are quite exceptional, and, as a rule, there will be immediate and great suffering. The tongue swells, the throat is also swollen and inflamed, and the swallowing of saliva even may be impossible. If the acid has been in contact with the epiglottis and vocal apparatus, there may be spasmodic croup, and even fatal spasm of the glottis. (BLYTH). The corrosive action extends down to the stomach. There is extensive vomiting, and the whole of the lining membrane of the gullet may be thrown up. Death may take place within from twenty-four to thirty-six hours, but when large doses have been taken on empty stomach, the latter may be absolutely dissolved, the same symptoms as of perforation of the stomach may set in, and the death may be very sudden.

Treatment in sulphuric acid poisoning.

682. The treatment to be of any good should be immediate: finely-divided chalk, magnesia, or sodic carbonate, may be used, dissolved in water. Wall plaster will often be the first thing to come to hand, and, under any circumstances, enormous doses of water should be given, so

as to dilute the acid. The stomach-pump should not be used. In the case quoted by CHEVERS, nourishment was given entirely by nutritive enemata for six weeks, with success.

683. We can find no recorded cases of poisoning by hydrochloric acid in this country. Its effects are similar to those of sulphuric acid, except that it produces white stains upon the skin. Hydrochloric acid poisoning.

684. Dr. Rogers speaks of two cases of poisoning having occurred during 1883, in which nitric acid was found mixed with coffee. CHEVERS appears to have met with no cases of poisoning with nitric acid, and such cases are probably very rare in this country. The smallest fatal dose on record is two drachms, which killed a child of thirteen. (BLYTH). The vapour, if inhaled in large quantities, proves fatal, and cases have occurred in which a vessel containing the acid has broken, and death has been caused by the fumes having been suddenly inhaled. The symptoms are almost exactly the same as those of sulphuric acid poisoning. Nitric acid poisoning.

685. Cases of poisoning by ammonia are also very rare in this country, and would probably only occur from accident. The fumes of ammonia are as dangerous to life as those of nitric acid. Ammonia is largely used in the *Carré* ice machines (boiling process) and accidents are liable to happen. An accident very nearly happened to one of the authors whilst looking at a machine reported to be out of order. There was a slight escape, and, whilst investigating the cause, the machine suddenly burst. It was luckily in the open air, and we were all on the windward side, but the vapour shot out in a fountain about fifteen feet high, causing an intense pungently suffocating smell. Had it occurred in a confined room, some serious injury might have been casued. Falck, quoted by Blyth, has found, throughout literature, notice of only thirty Ammonia poisoning.

cases of poisoning by ammonia. In two cases it was used with a homicidal purpose, in eight with suicidal intent, and in the remainder the cases were accidental.

Symptoms of ammonia poisoning.

686. The *symptoms* of ammonia poisoning are—a sense of constriction in the epigastrium, burning in the throat and giddiness, vomiting, pulse small and frequent, face pale, the mouth and throat strongly reddened, with increased secretion and feeling of suffocation. In strong doses, of from five to thirty grammes, death may ensue as quickly as from prussic acid. A case is recorded of a man who, having been bitten by a mad dog, took a mouthful of solution of ammonia and died in four minutes.

Treatment and antidote in ammonia poisoning.

687. If there is no vomiting, it should be produced by giving plenty of lukewarm water, after which give diluted vinegar or the juice of lemons, limes, or oranges, olive oil, the white of eggs, barley water, arrowroot, and always plenty of water. If there is œdema of the glottis, tracheotomy should be performed to prevent suffocation. In poisoning by ammonia, with croupous respiration, keep the room warm, and fill it with steam by means of a bronchitis kettle. Relieve pain by small doses of opium injected subcutaneously.* (BLYTH).

Caustic potash, soda, potassium, etc.

688. Caustic potash and soda, neutral sodium, potassium and ammonium salts, are so rarely used in cases of criminal-poisoning in this country, that they scarcely come within the scope of this book.

Volatile acids, petroleum, etc.

689. Volatile acids and those capable of being distilled from neutral or acid liquids, include petroleum, with all its various products, such as cymogene, gasolene benzene, benzoline, and naphtha. We are not aware that as yet any cases of poisoning have occurred from any of these liquids, and shall not therefore further notice them, except to state that, should such cases occur, they will probably be acci-

* That is, beneath the skin.

dental or suicidal, and the antidote which should be used is the stomach-pump and emetics, a subcutaneous dose of atropine, and alternate douches of hot and cold water to the chest, if necessary. The heart to be maintained by mild interrupted shocks of the battery. (BLYTH).

690. Cases of poisoning by camphor are rare both in Europe and in this country, but CHEVERS records two cases. In one case, which proved fatal, the camphor was found administered in sweetmeats, and the man died two days afterwards. A lump of camphor was found in the stomach. The other case was that of a boy, who took a pice-worth that of camphor as a cure for dyspepsia and flatulency. The symptoms were, "giddiness and a burning sensation all over the body, especially in the eyes. He then fell into a profound sleep and remembered nothing more; but the man who brought him to the hospital said that he could not open his mouth, and had severe twitchings in the eyes and the muscles of the arms. On admission he was quite sensible, but complained of giddiness and great lassitude. Temperature normal, pulse 76, and respiration tranquil; pupils slightly dilated and responding to light. Upon the action of an emetic, the vomited matter did not smell of camphor, but during the day his breath did. There were subsequently headache, drowsiness, and some difficulty in micturition* and pain in the loins. He was discharged well the next day." HEHIR mentions a case of camphor poisoning in a lady who took about two ounces of spirit of camphor to relieve the headache and discomfort associated with suppressed menstruation. The chief symptoms were giddiness, delirium, vomiting, and great abdominal pain. The vomited matters smelt of camphor. These symptoms were relieved by repeated hypodermic injections of one-third of a grain of morphine; the patient got well in 18 hours. Camphor poisoning.

691. Blyth describes the symptoms thus: It acts energetically on the brain and nervous system, especially if Symptoms of camphor poisoning.

* Or passing water.

it is given in strong alcoholic solution. From seven to forty drops of Rubini's homœopathic camphor, taken for colds, sore-throats, etc., have produced coma, foaming at the mouth, convulsions, and partial paralysis. The smallest dose known to have produced violent symptoms in an adult is twenty grains; the largest dose known to have been recovered from is 160 grains.

692. The bodies of animals and persons dying from poisoning by camphor smell strongly of the substance. The mucous membrane of the stomach has been found inflamed, but there seems to be no characteristic lesion.

Treatment and antidotes for camphor poisoning.

693. The stomach-pump or emetics, hypodermic injections of brandy, inhalations of ether, the alternate hot and cold douche, warmth to the extremities by hot blankets, hypodermic injections of morphine if there is pain, etc. (BLYTH).

Alcohol poisoning.

694. *Alcohol*, as a criminal means of poisoning, calls for no comment, and the discussion of such cases may be left to other authorities.

Ether, chloroform and chloral poisoning.

695. *Ether* and *chloroform* poisoning rarely occur in criminal practice. When death happens, it is generally whilst the patient is undergoing an operation. Cases of chloral-poisoning are frequent in Europe from over-doses, by those who habitually take it, but cases of this kind are rare in this country. HEHIR relates the circumstances connected with a case—that of a drunkard who relinquished alcohol in favour of chloral hydrate.

Carbolic acid poisoning.

696. Although poisoning by carbolic acid is exceedingly common in England, owing to its rapidly increasing use, cases are rare in this country. BLYTH says, that of all powerful poisons, it is the most accessible, and the most recklessly distributed. The acid was discovered in 1834, and was first used by Mr. (now Sir Joseph) Lister about 1863. It only became generally known much

later, but at present it occupies the sixth place in fatality in all poisons in England. Since 1868, Falck has collected no less than eighty-seven cases of poisoning from carbolic acid, in eighty-five of which the poisoning was by the liquid acid. Seven of these cases were suicidal, and of these, five died; thirty-nine were poisoned through the medicinal use of carbolic acid; twenty-seven by the antiseptic* treatment of wounds by carbolic acid dressings, and of these eight terminated fatally; in eight cases symptoms of poisoning followed the rubbing or painting of the acid on the skin for the cure of scabies or itch, favus† or psoriasis,‡ and six of these patients died. In four cases, carbolic acid enemata, administered for the purpose of dislodging thread or so-called "seat" worms, gave rise to symptoms of poisoning, and in one case death followed. In one case that came under HEHIR'S observation, the patient swallowed about 4 ounces of carbolic oil (of 1 to 40 strength). He recovered with the greatest difficulty, notwithstanding that the treatment was prompt and in accordance with orthodox methods. In another case a solution of carbolic acid was injected into the rectum to wash out the lower part of the bowel after the ligation of some internal hæmorrhoids or piles. The solution was retained and about two drachms of carbolic acid absorbed. The patient (an aged female) suffered from the ordinary symptoms of carbolic acid poisoning. The urine was "tarry;" all the excreta, and even the breath, smelt of the acid, and symptoms of nervous prostration were present. We can find no recorded case of homicidal poisoning with carbolic acid, though when we learn that no less than ten persons took carbolic acid in mistake for

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* *Antiseptics* are medicinal agents that possess the power of preventing or destroying putrefaction, or preventing the multiplication of the bacteria upon which putrefaction depends.

† *Favus* is also called *honeycomb-ringworm*, on account of the shape of the pustules that form.

‡ *Psoriasis* is a chronic inflammatory affection of the skin, distinguished y dry, red, roundish patches, covered with silvery scales.

various alcoholic drinks, such as schnapps, brandy, rum, or beer—nine of whom died, and that seventeen others took the acid simply by mistake, of whom thirteen died—it seems strange that as yet the poison has found no place in criminal cases.*

Symptoms of carbolic acid poisoning.

697. If swallowed in solution, or in the form of an undiluted liquid, the patient experiences a hot burning sensation, extending from the mouth to the stomach. This feeling is experienced during the act of swallowing, and the lining membrane of the mouth is whitened and hardened. Carbolic acid is rapidly absorbed, and in the course of a few minutes the system may be profoundly affected. In two instances, the rapidity of action was comparable to that of prussic acid. Nervous symptoms are those most strikingly manifested, such as delirium, giddiness, and profound insensibility. Nausea and vomiting were present in not more than one-fifth of the observed cases. These symptoms may, however, be severe and uncontrollable. There is extreme feebleness of the pulse, a dry harsh skin, with lividity of the surface. The urine is often of an olive-green or even black hue; but this symptom is more common in sub-acute than in acute and rapidly fatal cases. The pupils are generally minutely contracted. Convulsions and trismus or "locking of the jaws" are not infrequently observed (TAYLOR).

Fatal dose of carbolic acid.

698. The smallest fatal dose of carbolic acid is unknown. A few grains might prove fatal, and six or seven drops have produced serious results (TAYLOR). Falck, quoted by Blyth, has put the minimum fatal dose for a man at 231·5 grains. The largest dose from which a person appears to have

* Whilst this book has been passing through the press, a circular was sent to all dispensaries and hospitals asking whether any cases of poisoning, by carbolic acid, had occurred during the last five years. Answers were received from more than sixty practitioners, but in only one case was it stated that symptoms of poisoning had occurred after a carbolic acid dressing to a wound. The case recovered. It seems probable that accidental cases may have occurred, which have not been detected, since the only case mentioned appears to have been noticed by accident.

recovered, is that given in a case recorded by DAVIDSON, in which over 2,310 grains (150 grammes) had been taken.

699. A case is recorded in the *Lancet* of May 19, 1883, in which a practitioner in Calcutta injected into the bowels of a boy, aged five, an enema of diluted carbolic acid, which, according to his own statement, was one part in sixty, and the whole quantity represented 144 grains of the acid. The child became insensible a few minutes after the operation, and died within four hours. The body smelt strongly of carbolic acid.

Case of carbolic acid poisoning.

700. Give half an ounce of sulphate of magnesia (Epsom salts), or the same quantity of sulphate of soda (Glauber's salts), dissolved in half a pint of tepid water. The soluble sulphates form sulpho-carbolates in the blood, which are harmless. Use the stomach-pump, or, if there is great destruction of the mucous membrane, excite vomiting by injecting, subcutaneously, from five to six drops of the apomorphine solution, or give an emetic of zinc sulphate, ipecacuanha, or mustard. Wash out the stomach with sulphate of soda or magnesia, dissolved in large quantities of warm water, until the smell of the acid is no longer perceived; leave the stomach full of the solution so that it may be absorbed. Albumen in the form of white of egg may also be given, as well as such stimulants, as brandy and water, chloric ether, and aromatic spirits of ammonia. It is important to apply warmth to the extremities. Inject, subcutaneously, two to three drops of a 1°/₀ solution of atropine hypodermically.

Treatment and antidote in carbolic acid poisoning.

701. *Prussic acid* (hydrocyanic acid), though rare in this country, occupies the second place among poisons in order of frequency in England, and accounts for about forty deaths annually. Out of a thousand deaths from poisons of all kinds, 289 males and 67 females are likely to die from prussic acid or cyanide of potash (BLYTH). The dilute acid of the *British Pharmacopœia* contains 2 per

Prussic acid poisoning.

cent. of anhydrous acid, Scheele's acid 4 per cent. These poisons are rarely used for the purpose of murder, owing to the probability of detection from the rapid death and the certainty of tracing the poison. Out of 793 poisoning cases of a criminal character in France, only four were by the cyanides. The leading English cases are those of *John Tawell* (Slough Case, 1850); *George Ball* (Lewes Case, 1860); and *Peter Walker* (Egglesham Case, 1857). The first of these cases was a most extraordinary one: The murderer had been, as a young man, convicted of forging a bill for £1,000, and had been sentenced to transportation for life. After a short time, owing to exemplary conduct, he obtained partial exemption from discipline, and became the principal druggist in Sydney. After many years he went home with a fortune and was highly respected as a religious and charitable man. The woman he killed, however, had been his mistress, and he killed her because she threatened to disclose their intimacy after his marriage. He visited the woman in disguise and administered the prussic acid in some porter. Death was almost instantaneous, but in the meantime the prisoner got out of the house and went off to London. The telegraph had just been invented, and he was traced. He was convicted, and, before his execution, made a full confession to the chaplain. This statement, however, the chaplain refused to give up—it was in writing—on the ground that it had been made under the seal of confession. (STEWART'S *Trials for Murder by Poisoning*).

Case of prussic acid poisoning.

702. The only case of prussic acid poisoning to be found in the records of the Chemical Examiner, Madras, during the past few years, occurred at Punamali, in November 1884. A man was arrested for the supposed murder, but he was acquitted. The case was possibly suicidal. In this instance, a quantity of prussic acid, equivalent to thirty-six minims of the ordinary medicinal acid, was recovered from the stomach and contents and other viscera forwarded for examination. HEHIR met with one case of sui-

cidal poisoning by cyanide of potassium, the poison having been procured from an electro-plater in a bazaar. The patient died within five minutes of taking about 20 grains of this poison. The patient left a written statement as to the cause of death.

703. The smallest recorded *fatal dose* of prussic acid is twenty minims of Scheele's acid, fatal in twenty minutes. Largest dose with recovery, one drachm (sixty grains) of Scheele's acid. The average fatal dose of the 2 per cent. acid is thirty minims (*Ibid;* C. C. Stewart). TAYLOR states it to be 45 minims of the dilute acid of the *Pharmacopœia.* Fatal dose of prussic acid.

704. Antidotes are generally useless, since death is so sudden, a large quantity killing in from two to five minutes, though insensibility may occur in a few seconds. If seen at once, stomach-pump or any emetic at hand. A moderately dilute solution of potash, lime or washing soda, along with a little ferrous sulphate, would render harmless so much of the poison as was still in the stomach unabsorbed. Ammonia and chlorine water have also been used. Give stimulants, brandy, chloric ether, sal volatile, etc., *ad libitum.* If the patient cannot swallow, give stimulants in the form of enema. A hypodermic injection of one-fiftieth of a grain of atropine. Artificial respiration may be useful in keeping up life till the poison is eliminated from the body. Treatment and antidotes for prussic acid poisoning.

705. There are no characteristic *post-mortem* appearances, which, on the whole, resemble those of asphyxia. The odour, however, should be a guide—that of bitter almonds, and the organs should be sealed up in stoppered bottles and sent for analysis at once, as the poison is very volatile. *Post-mortem* appearances in prussic acid poisoning.

706. According to ALLEN, detection is rarely possible after more than twenty-four hours; but CASPER detected eighteen milligrammes eight days after death; Sokoloff found it after sixty days in a hound; and Reichardt two

months after death. It is generally supposed that death from prussic acid is instantaneous, but this belief is not supported by facts. Even in strong doses, at least, ten seconds intervene between death. BLYTH says, according to his own experiments, he has found that, in ten seconds, he could drink a liquid from a bottle, cork the bottle, get into bed, and arrange the bed clothes in a suitable manner; he could also throw the bottle away, or out of the window. This is a point which might become of great importance in a trial for poisoning by prussic acid, where death is supposed to occur so rapidly. TAYLOR records a case in which a woman drank a fatal dose of essence of almonds (essence of almonds contains prussic acid); she went to a well in the yard, drew water, and drank a considerable quantity. She then ascended two flights of stairs, fell on her bed, and died in half an hour.

CHAPTER V.

VEGETABLE POISONS.

Vegetable poisons—Aconite poisoning—Difficulty of detecting aconite poisoning—The aconite shrub—Statistics of aconite poisoning—Symptoms of aconite poisoning—Medicinal use of aconite—Treatment and antidotes for aconite poisoning—General remarks on aconite—Statistics of aconite poisoning—Strychnine—Characteristics of strychnine—Case of strychnine poisoning—Difficulty of detection of strychnine poisoning—Statistics of deaths from nux vomica and strychnine—Quantity of strychnine likely to prove fatal—Symptoms of strychnine poisoning—Table of diagnosis of death by strychnine—*Post-mortem* appearances in death from strychnine poisoning—Treatment in strychnine poisoning—Nux vomica eaters—Strychnos tetanus or disease tetanus—Description of atropine or dhaturine—History and statistics of dhatura poison in India—English statistics of death from atropine—Dhatura poisoning in India—Fatal dose of atropine—Symptoms of dhatura poisoning—Chronic poisoning by atropine—Treatment in atropine poisoning—Remarks regarding dhatura—Various appellations for Indian hemp or cannabis Indica—Effects of cannabis Indica—Ganjah-smoking—Fatal results—Murder under influence of bhang—Curious case of poisoning—Symptoms of tincture of cannabis on delicate women—Cannabis used as an intoxicant—Aconite used as a poison—Opium—Medicinal use of opium—Statistics of opium poisoning—Opium-eating and opium-smoking—Ordinary dose of opium—Fatal doses of opium—Statistics of opium poisoning—Symptoms of opium poisoning—Antidotes to opium poisoning—*Post-mortem* appearances of opium poisoning—Other vegetable poisons—Remarks regarding poisons.

Vegetable poisons.

WITH the exception of arsenic, the poisons most generally in use in this country are derived from the Vegetable Kingdom, and there can be no doubt that there are a number of poisons used, with the properties of which we are only imperfectly acquainted, or of which we are entirely ignorant. Several of these poisons leave no trace whatsoever. This is proved by the number of cases alluded to by the chemical examiner, in which no poison could be detected, although there could be no doubt that poison had been administered. For instance, in Vizagapatam, eleven persons were attacked with drowsiness and delirium, with dilated pupils and œdematous eyelids, shortly after eating

some cakes.* Five of these persons died, but no trace of poison could be detected in the viscera. Generally speaking, it may be said that, with the exception of arsenic, mineral poisons are rarely used in this country, probably owing to the facility of detection. Arsenic is probably so common because its effects so strongly resemble those of cholera, and there are good grounds for supposing that advantage is often taken of an epidemic of cholera to remove persons by means of arsenic poisoning. Detection at such times is rendered more difficult, owing to the haste with which the bodies of persons who have died from cholera are burnt, together with their clothing, etc., and the evacuations disposed of. As this portion of the work is not intended to be a treatise on poisons generally, only those will be alluded to which appear to be most commonly in use.

Aconite poisoning.

707. There were two cases of poisoning by *aconite,* detected by the Chemical Examiner in 1883, against four in the previous year. Aconite is probably the oldest known poison in India, and its very name, *Bish* or *Vish,* is the original Sanscrit name for poison generally. CHEVERS gives a variety of names by which it is known, such as Bish, Bikh, Meetha Theelia, Meether Zuher, Ati Suigia Bish, Suigia Jur, Suigia Khar, Beechnak, Batsnab-bide (Bengalee), Mahoor (Hindi), Ativassa (Telugu), Nabi (Tamil). It is, however, very probable that some of these names refer to different species of the same plant. Aconite is also often used in conjunction with datura. The European plant is known as *Aconitum Napellus,* or Monkshood; it belongs to the natural order *Ranunculaceæ* or Crowsfoot. It is also known as wolfsbane or blue rocket. The Indian species is known as the *Aconitum ferox,* and possesses far more poisonous properties than the European plant. Guy says that "there is reason to believe that *aconitia,* the active principle of the plant, is the most deadly poison in existence. In his *Trials for Murder by Poisoning,* STEWART says "that pure aconitia

* Chemical Examiner's Report, 1883.

is, perhaps, the most deadly poison with which we are at present acquainted, and that all the preparations of aconite are excessively dangerous." The use of this poison has been prevalent from the very earliest ages, not only for internal administration but also as a poison for arrows, etc. The Nagas and Santhals (aborigines) are said to poison their arrows with a concentrated extract of the *aconitum ferox*, in the same way that the American Indians use *curara*.

708. The use of aconite as a poison in this country appears to be on the decrease, perhaps, because the poison can now be more easily detected than formerly. Very great care, however, must be taken that the alkaloid discovered is not confounded with cadaveric alkaloids.* This was made a great point in the defence of Dr. Lamson, which is the most recent case of aconite poisoning. Mr. Montagu Williams, in his speech for the defence, laid great stress on the admitted inability of the scientific witnesses to rely on any other test than that of taste. "Scientifically," he said "it was a leap in the dark, and they had to traverse a region of science up to the present moment unexplored. Who knows about aconite? and echo answers, Who? What was it? The root of monkshood. Aconite was one form, and aconitia was the active principle of that form; and up to the present moment, with the exception of one reported case, there was not a single authority on the subject." In Dr. Lamson's case, the medical witnesses could only say that they thought death had been caused by a vegetable alkaloid, and considered that it must be aconite. Their opinion, however, was formed, not from personal experience in cases of aconite poisoning, but from what they had

Difficulty of detecting aconite poisoning.

* *Ptomaines* or *cadaveric alkaloids* are a class of organic bases generated in animal matter during putrefaction, during morbid conditions prior to death, and even, it is said, during normal healthy conditions of life. Some ptomaines closely resemble the vegetable alkaloids, not only in their chemical reactions, but in their physiological properties. The chief interest attaching to this class of bodies arises from their liability to be confounded with well-known natural alkaloids and hence to lead to mistakes in medico-legal practice.

read of the poison and the symptoms exhibited by the deceased. From the contents of the stomach a vegetable alkaloid was extracted, and this extract gave the taste of aconite, which, STEPHENSON said, was different from some eighty alkaloids which he had tasted; the same extract, injected into the back of a mouse, killed the animal in two minutes.* Therefore, STEPHENSON said, judging from the symptoms, the taste, and the effect upon the mouse, "I consider the alkaloid must have been aconite." So deadly is this poison, that one-thirteenth of a grain of aconitia is a fatal dose, and enough of the alkaloid was discovered in the stomach of the deceased to kill two persons.

The aconite shrub.

709. The shrub itself is thus described by GUY: "It is a beautiful plant, from two to six feet in height, with dark-green leaves, of very characteristic form, and a terminal spike of rich blue flowers. It grows in hilly ground, and is often cultivated as a garden flower. All parts of the plant are poisonous, but the root is the most active." The root is a tuber, and has frequently been eaten in mistake for horse-radish, but whereas horse-radish is fibrous and stringy when broken or divided, the aconite root is friable and succulent. CHEVERS describes the root, which is used in this country, as "being brittle and breaking with a resinous fracture. It is readily reduced to a coarse powder, and in this state is destitute of smell, slightly bitter to the taste, the tongue being benumbed wherever touched on. The roots are sold in every bazaar in India, and may be purchased in large quantities for about two rupees per pound."†

Statistics of aconite poisoning.

710. BLYTH says: "I have collected, from European medical literature of the last ten years, eighty-seven cases of poisoning, by aconite, in some form or other. These

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* *Note.*—At the same time it should be noted that a mouse has been killed by an injection in the same way of *pure water;* but it would be useful to know whether in this case the spine of the mouse was not injured by the needle.

† *Aconitum heterophyllum* is non-poisonous. The root is different in appearance from the poisonous variety, and is used as a tonic.

comprise only two cases of murder, seven of suicide, and seventy-seven which were more or less accidental."

Symptoms of aconite poisoning.

711. The symptoms are, perhaps, best described by CHEVERS (see Illustrative Case No. LXXXIV following). A man, by accident, chewed aconite root. Immediately afterwards he experienced a sweetish taste, followed immediately by tingling of the lips and tongue, numbness of the face, and severe vomiting. On admission to the hospital, he was extremely restless, tossing his limbs about in all directions and changing his position. He complained of a burning sensation in his stomach, and a tingling and numbness in every part of the body, except in the legs. The tingling was especially marked in the face and tongue, so much so that he was constantly moving the latter to and fro in order to scratch it against his teeth. Retching and vomiting occurred almost incessantly, and he constantly placed his hand over the cardiac region. His face was anxious, the eyes suffused, the lips pale and ex-sanguine,* the eyelids swollen, the pupils moderately dilated, and insensible to the stimulus of light;† the respiration was laboured, sixty-four to a minute; the pulse sixty-six, small and feeble. There was inability to walk from loss of muscular power, but the man was perfectly conscious. The stomach-pump was used and albumen and milk administered. Three and three-quarters of an hour after admission, the symptoms increased in severity. The tongue was red and swollen, the pulse intermittent,‡ more feeble, and slower. The tingling and numbness had extended to the legs. On examining the condition of the external sensibility with a pair of scissors, it was found that, on fully separating the blades and arms, and bringing the points in contact with the skin over the arms and forearms, he felt them as one, although they were four inches

* Or bloodless.

† The normal pupil becomes smaller on exposing the eye to light.

‡ Missing one beat after three, four, or more consecutive pulsations.

apart. He began to improve about the ninth hour, and gradually recovered, although he suffered for one or two days from slight diarrhœa. HEHIR mentions an instance in which symptoms of aconite poisoning resulted from the application of a paste consisting of powdered aconite root and linseed oil to an inflamed testicle.

Medicinal use of aconite.

712. Aconite is used medicinally for neuralgia, and in this country, by Natives, for leprosy, fever, cholera, and rheumatism. Amongst the hill tribes, especially in Burma and Assam, it is used for poisoning the heads of arrows, and it is probably this same poison which is used by the Andamanese for a similar purpose. So deadly are its effects that the slightest scratch from a poisoned weapon proves fatal. It is used by the Mishmees, a tribe of Assam; and it is said that an elephant struck in the shoulder by a poisoned arrow discharged from a gun, dies in a few minutes, but if struck in the hind-quarters, he lives till next day.

Treatment and antidotes for aconite poisoning.

713. The only antidotes seem to be the use of the stomach-pump and emetics, and after the stomach has been emptied, give *atropine*, by hypodermic injection or by mouth. Apply a mustard plaster to the pericardium, and aid vomiting by plenty of water, to which a little alcohol may be added. Give stimulants freely—brandy, sal volatile, or chloric ether. Warmth to the extremities. Keep the patient lying down. If no improvement, give 20 minims of tincture of digitalis (foxglove) hypodermically, and repeat it in half an hour if the pulse improves under its use. Artificial respiration may be kept up for two hours if necessary.

General remarks on aconite.

714. The Japanese are said to use a species of aconite root, which they call *Küsa-usü*, and it seems certain that there are very many kinds of the plant which vary in their poisonous characters. The late Dr. Rogers of Madras, discovered a process by which the detection of aconite could be greatly facilitated, if not made certain, and he pro-

mised to prepare a paper on the subject for this volume which would throw considerable new light upon this important point. If, however, that is the case, any discovery he made has unfortunately died with him, for he has left no notes on the subject. BLYTH says: "In our present state of knowledge, the identification of the active principle of the aconites must rest entirely upon physiological evidence, for though the substance may be isolated and identified as an alkaloid, yet the chemical tests (such as, that it strikes a red colour with sugar and sulphuric acid, and a violet when stirred up with some drops of syrupy phosphoric acid and heated for fifteen minutes on the waterbath) are not to be relied upon." Munro killed a sparrow with one grain in less than an hour, but the extract which, when mixed with some crumbs of bread, killed a tomtit in two or three hours, did not respond either to the taste or to any chemical test. (*Ibid.*)

715. The following table shows the number of cases of aconite poisoning in the Madras Presidency during the five years 1885-89 :— Statistics of aconite poisoning.

	Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of deaths reported.
1885	1	...	...
1886	...	...	...
1887	4	4	5
1888	5	4	4
1889	8	5	8
Total	18	13	17

716. *Strychnia, Strychnina, or Strychnine,* is the poisonous vegetable alkaloid of five plants, all natives of hot climates: the *Strychnos nux vomica; S. Ignatia; S. Tienté;** Strychnine.

* The affixes *ine, ia, ina,* indicate alkaloids. Strych*nine* is also called 'Strych*nia*." On the other hand, the affix *in* has reference to a non-alkaloidal body, such as pilocarp*in*, alo*in*, picrotox*in*, or Java poison, etc., which is a watery extract of the *Strychnos Tienté*.

*S. Toxifera** and *S. Colubrina.*† The former is the species found in India, where it grows as a tree, and is known as Yetti maram (Tamil), Musadi chettu (Telugu), Koochila (Hindustanee and Bengalee), and Veeshamoostie and Kulaka (Sanscrit). The seed is easily obtainable in almost every bazaar. The poisonous properties are contained in the seed and also in the bark. The seeds, three to five in number, are inclosed in a fruit, resembling in appearance a small orange but very variable in size. The seeds are disc-shaped, concavo-convex, about an inch in diameter, and a quarter of an inch thick, and of ash grey colour; when cut in two they show a circular central cavity and a heart-shaped embryo.

Characteristics of strychnine.

717. *Strychnine* is so powerfully bitter that one part dissolved in 70,000 parts of water is distinctly perceptible. It is said to be one of the easiest alkaloids to detect, and $\frac{1}{500000}$ of a grain is discoverable by the colour tests. Putrefaction does not change it, and it has been discovered in the tissues after *eleven* years, and yet there are few analyists who have not, on some occasion, failed to find it.

Case of strychnine poisoning.

718. HEHIR describes a remarkable case illustrative of this point which came under his observation last year. A man, after quarrelling with his wife, went to the bazaar and returned home with a bottle of arrack of some description. He induced his wife to partake of it. Within an hour the unfortunate woman had unequivocal symptoms of strychnine poisoning. She died eight hours after drinking the liquor. Whilst the symptoms were severe, she was seen by two physicians, neither of whom entertained the remotest doubt as to the nature of the case. The stomach and its contents, together with all the vomited matter, were packed with the utmost care and sent to a Government analyst, but no poison was discovered. TAYLOR

* The active principle of the poison used in Guiana is called *curare*, which is the juice of the Strychnos Toxifera.

† All of the Natural Order *Loganiaceæ*.

failed to find it in the body of an animal which had been killed by administering five grains hypodermically. A very small quantity, about one grain, is sufficient to destroy life.

719. The reason why failure so often occurs in the detection of the alkaloid is, that even of the one grain sufficient to kill, only a very small portion is absorbed; the rest is eliminated by vomiting (when it occurs) and by the urine and fæces. The absorbed portion is diffused with great rapidity through a large mass of blood and tissue, and the result is that we are looking for one part of the poison in about a million times its weight (STEWART'S *Trials for Murder by Poisoning*). In the celebrated *Palmer* case, TAYLOR was unable to find any trace of strychnine in the stomach and viscera, and yet Palmer was convicted of having caused Cook's death by administering strychnine. This failure of detection was made a strong point in the defence, and HEREPATH, another celebrated analyst, swore that if there was $\frac{1}{5000}$th part of a grain in the body, it should have been detected. If even so small a quantity were there, this no doubt is true; but if the poison has been absorbed, or has been passed out by the evacuations, it is no longer there, although death may have been caused by it. There also seems reason to believe that, in the act of absorption, the alkaloid itself undergoes a change. Again, there may be no strychnine in the stomach, but it may be found in the rest of the organs, blood, muscles, nerve tissues, etc., so that, if necessary, the whole of the body should be tested, which, in this country, is practically impossible. Strychnine is used principally as a vermin-killer in the preparations known as Battle's, Butler's, Gibson's, and Miller's Rat-powder, Marsden's and Barter's vermin-killer. Stewart says, that in Keating's Insect-powder, he has found *neither* strychnine nor arsenic. It is also used in the British and Continental Pharmacopœias. In the former we have the *Liquor Strychninæ* (which is a one per cent. solution of sulphate of strychnine, with a dose of from five to

Difficulty of detection of strychnine poisoning.

ten minims), the alkaloid *strychnine* itself (dose $\frac{1}{30}$ to $\frac{1}{12}$th of a grain), and the extract and tincture of nux vomica.

Statistics of deaths from nux vomica and strychnine.

720. Nux vomica and strychnine accounted for six deaths in Madras and five deaths in Bombay during 1882 and 1883 (as far as cases have come before the chemical examiners). In England, during the five years 1875-80, out of 1,581 total deaths from poison, strychnine and nux vomica accounted for seventy-nine, or an average of nearly sixteen a year, which is about five times as much as the proportion of deaths from this poison, to the population in the Madras Presidency. The actual figures in Madras for the five years 1885-1889 are as follow:—

	Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of deaths reported.
1885 ...	1	1	1
1886 ...	1	1	1
1887 ...	3	3	3
1888 ...	...	...	...
1889 ...	4	3	3
Total	9	8	8

Quantity of strychnine likely to prove fatal.

721. As regards the quantity that is likely to prove fatal, there appears to be a variety of opinions: BLYTH estimates it at $\frac{7}{10}$ths of a grain, TAYLOR at from ·5 to 2 grains, and Guy puts the minimum at ·25 grains. Large doses of strychnine may be recovered from, if the medical treatment is prompt. In a case related by Schwanenstein, a suicidal chemist took from 7·4 to 9·25 grains of strychnine nitrate, and half an hour afterwards 9·25 grains of morphine acetate. Two and a half hours afterwards convulsions set in, and when the physician who had been called came, he was in general tetanus. The treatment consisted of emetics, and afterwards tannin and codeine; on the third day recovery was complete.

Symptoms of strychnine poisoning.

722. The following are the general symptoms produced by strychnine poisoning: The commencement of the symptoms may be extremely rapid, the rapidity being mainly dependent on the form of the poison and the manner

of its application. Should the poison be in solution the patient complains of a hot and intensely bitter taste during swallowing, and other symptoms ensue very rapidly, the earliest being a feeling of suffocation and difficulty of breathing, which come on without any warning. When nux vomica has been taken, or strychnine given in the form of a pill, the symptoms generally commence in about half an hour. At first there is, in a few cases, a feeling of uneasiness and heightened sensibility to external stimuli, a strange feeling in the muscles of the jaw, and a catching of the respiration; but, generally, the onset of the symptoms is as sudden as epilepsy, and previous to their appearance the person may be pursuing his ordinary vocation, when, without preliminary warning, there is a shuddering of the whole frame and a convulsive seizure. The convulsions take the form of violent general tetanus: the limbs are stretched out involuntarily, the hands are clenched, the soles of the feet incurved, the head is jerked backwards, and, in the height of the paroxysm, the back may be arched and rigid as a board, the sufferer resting on the head and heels, and the abdomen tense. In the grasp of the thoracic muscles, the walls of the chest are set immovably, and, from the impending suffocation, the face becomes congested, the eyes prominent and staring. The muscles of the lower jaw in the disease tetanus, *the first to be affected*, are in strychnos tetanus, as a rule, *the last*—a distinction, if it were more constant, of great value. The convulsions and remissions recur until death or recovery, and, as a rule, within two hours from the commencement of the symptoms, the case, in some way or other, terminates. During the interval of the paroxysms the intellect is clear and the patient is cognizant of his danger. In a few cases the third spasm has passed into death, in others there have been a great number. The duration of a spasm is also very different, and varies from thirty seconds to five or even eight minutes; the interval between lasting from forty-five seconds to one, or even one and a half hours.

Table of diagnosis of death by strychnine.

723. The following table will assist in forming a Diagnosis of Death by Strychnine, and that the result of Disease :—

Tetanus from exposure to cold or wet, or the result of a wound.	Tetanus from strychnine.	Hysteria.	Epilepsy.	Tetanus occurring during the action of other poisons.
1. Presence of wound. Symptoms have no connection with any liquid or solid swallowed.	1. Some solid or liquid taken within a short time of the commencement of symptoms. Not connected with any peculiarity of constitution.	1. Connected with a peculiar constitution. Rare in males.	1. Previous history of epilepsy.	1. Presence of other symptoms of poisoning peculiar to certain poisons.
2. Gradual accession and progress of the symptoms; difficulty in swallowing; stiffness of the jaws, neck, trunk, legs, and arms. Hands not generally affected.	2. Symptoms sudden and violent. All the muscles are affected at one and the same time. Arms affected, and hands clenched at the same time as the body and legs. Jaw not affected or fixed, only during efforts to swallow.	2. Presence of known signs of hysteria.	2. Presence of the *aura epileptica*. Tongue bitten; insensibility lasting for some time.	*Obs.*—Arsenic, antimony, and other irritant poisons may sometimes cause tetanic spasms; but other symptoms are present which point to the nature of the poison.
3. Curving of the spine forwards not primarily present; generally comes on after some days of previous illness.	3. Opisthotonos an early symptom generally appearing in a few minutes.	3. Spasms frequently convulsive, alternating with stiffness of the muscles. Loss of consciousness	3. Alternate contraction and relaxation of the muscles.	
4. Symptoms may undergo abatement, but there is no perfect intermission.	4. Intervals of complete intermission.	.....	......	......
5. Death after the lapse of several hours or days. Direct injury to spinal cord may give rise to tetanus and death in a few hours. Recovery slow.	5. Death usually occurs in three hours, or even less than a quarter of an hour. Recovery in a few hours.	5. Never fatal. Recovery very rapid.	5. Seldom fatal during first attack.	......

724. In deaths from strychnine poisoning, there are very few characteristic *post-mortem* appearances. Stiffness of the body is the chief characteristic, but this is very variable. In some cases the *rigor mortis* lasts no longer than in ordinary deaths, but sometimes, as in the *Palmer* case, the body remains stiff for two months after death. Where convulsions have been violent, Blyth says that he has found "considerable hæmorrhage in the trachea." Death may occur from asphyxia, in which case the ordinary signs of asphyxia will be found in the lungs, etc. The heart generally has its right side gorged with blood, but in a few cases it is empty and contracted.

Post-mortem appearances in death from strychnine poisoning.

725. The treatment in strychnine poisoning should be immediate, and the first thing to be done is to remove the poison by emetics or the stomach-pump. After tetanic symptoms have set in, the introduction of the tube of the stomach-pump may excite the paroxysms. *Animal* charcoal or tannic acid *ad libitum.* Bromide of Potassium in half ounce doses, with thirty grains of hydrate of chloral for the first dose, then half this quantity every twenty minutes or half hour if necessary, to lessen the convulsions; or chloroform, or, if neither is at hand, full doses of the nearest narcotic available. If the convulsions threaten to produce suffocation, tracheotomy may have to be performed, in order to produce artificial respiration. A hypodermic injection of one-third grain of *curare* may be given. Artificial respiration, if possible, is important, for if life be sustained for several hours, the chances of recovery are greatly increased. The rapidity of accession of symptoms and of the fatal termination will depend upon (1) the form, and (2) the quantity of the poison taken. The symptoms usually appear within an hour, death taking place within six hours. The smallest fatal dose is from $\frac{1}{4}$ to $\frac{1}{2}$ grain of strychnine, but very large doses have been taken with recovery.

Treatment in strychnine poisoning.

726. In this country nux vomica is often eaten instead of opium or bhang, and CHEVERS cites rather an important case

Nux vomica eaters.

of a person who was a great sufferer from rheumatism, and who took every day enough of *nux vomica* in water to make the body rigid. When the body became rigid, he remained quite sensible, but lost all feeling of pain. Another case is recorded of a young man who died (in 1849) four days after admission to the jail. He had been in the habit of eating some sweetmeats with which nux vomica was mixed, and, owing to the cessation of this food, a kind of epilepsy set in, from which he died. It appears that wrestlers are in the habit of taking a daily dose, in order to increase their strength, and in the same way, as with opium, if this dose is suddenly stopped, morbid symptoms are likely to set in. In some parts of Bengal it is also usual to take nux vomica as an aphrodisiac.* It is also alleged that it is sometimes mixed with arrack, in order to make the spirit more intoxicating. A case is recorded by HARVEY in which an infant at the breast suffered from symptoms of strychnine poisoning, the mother taking the drug at the time in medicinal doses. Symptoms of strychnine poisoning have resulted from the introduction of the pulp of the nux vomica seed into a wound.

Strychnos tetanus or disease tetanus.

727. In a trial for murder, by strychnine, the question may be raised, whether the tetanus and convulsions were not caused by disease, as in the case of *Palmer*, and it is therefore of the utmost importance that the symptoms should be carefully observed, especially since it is possible, as in *Palmer's* case, that no trace of the poison may be found in the body. The police and prosecuting vakeel should, therefore, be particular in eliciting all the symptoms, and the defence will be equally careful in endeavouring to ascertain whether these symptoms could not have been caused by injury or disease. *Brucia* is another poisonous alkaloid found in the seed and bark of the nux vomica and S. Ignatius' bean. It has exactly the same poisonous properties as strychnia, but in a less degree, variously estimated at a sixth or a twelfth.

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* *Aphrodisiacs* are agents which are said to stimulate the sexual passions

Description of atropine or daturine.

728. Atropine, or daturine, is the alkaloid which is found equally in all parts of the plant *Atropa belladonna*, or deadly night-shade, and in all species of datura. The species most common in India, and especially in the Madras Presidency, is the *Datura alba* or white datura, which is to be found growing on manure heaps near every village. A purple-coloured variety is also common, and a yellow species *(Datura atrox)* is found on the Western Coast. The leaves, stalk, ripe fruit, seed, unripe fruit, and root, all contain the poison. The datura seed, which appears to be chiefly used, is not unlike the capsicum or chilly seed, for which it has often been taken by mistake. Belladonna and stramonium are both used medicinally in liniments and tinctures, and the preparations contain a certain quantity of atropine.

History and statistics of datura poison in India.

729. As a poison, datura has been used in India from the very earliest times. Formerly, its use was very widespread, but of late years the reported cases, that is, those which come before the chemical examiners, show a considerable falling off. In Madras, in 1882-83, in only one instance was datura detected in viscera. In 1883 there were two cases only, neither of which was fatal. In one case seven persons were affected, and in the other, two. In Bombay four cases occurred during 1882-83 and five during 1883. In the last-mentioned cases twenty-eight persons were affected, but only four died. All these cases appear to have been connected with robberies.

English statistics of death from atropine.

730. The English death-statistics for five years ending 1880 record thirty-seven deaths (twenty-three males and fourteen females) from atropine, of which eight were suicidal and the rest accidental; the accidents were chiefly from mistakes in pharmacy. Of the 60 cases of belladonna and atropine, tabulated by Woodman and Tidy, there were only 14 deaths.

Datura poisoning in India.

731. Chevers has given a very full and exhaustive history of datura poisoning in this country, and, for the

purposes of this book, it does not seem necessary to do more than allude to it. Not only is the poison used by the criminal classes for the purposes of intoxicating their victims before robbing them, but it has frequently been used for purposes of domestic revenge. This poison probably formed the ingredients of the celebrated *poust*, which was frequently administered to royal princes, who, by rebellion or relationship, had rendered themselves obnoxious to the throne. CHEVERS says, that "there appears to be no drug known in the present day which represents, in its effects, so close an approach to the system of slow poisoning, believed by many to have been practised in the middle ages, as does the datura."*

Fatal dose of atropine.

732. It is impossible to state, with accuracy, the exact quantity which may cause death. One-eighth grain of atropine has been known to produce poisonous symptoms and two grains death. Blyth says, that probably one grain would, if unchecked by remedies, act fatally, but very large doses have been recovered from when treatment has been prompt. In this country, the preparation generally used is the bruised seeds or a decoction of the seeds or leaves. Death has been caused by the application of atropine to a blistered surface.

Symptoms of datura poisoning.

733. The symptoms of datura poisoning are thus described by Blyth: When the seeds, or fruit of atropine-holding plants, are eaten, there is a very appreciable period before the symptoms commence, and, as in the case of opium-poisoning, no very definite rule can be laid down, but usually the effects are experienced within half an hour. The first sensation is dryness of the mouth and throat; this continues increasing, and may rise to such

* Dr. Cullen favours us with the following:—

Mr. Gribble had a case in which a prostitute gave majnum—datura seed—in a sweetmeat, to a girl to enable a man to have intercourse with her. She stated it intoxicated her. When brought to hospital, she was in an excited state, laughing, talking, etc. After an emetic, she slept for some hours, and awoke all right.

a degree that the swallowing of liquids is an impossibility. There is also a spasmodic contraction of the muscles of the throat. The mucous membrane is reddened and the voice hoarse. The inability to swallow, and the changed voice, bear some resemblance to hydrophobia—a resemblance heightened by an inclination to bite, which seems to have been occasionally observed; the pupils are early dilated and the dilatation may be marked and extreme; the vision is deranged, and letters and figures appear double; the eye-balls are occasionally remarkably prominent and generally congested; the skin is dry, even very small quantities of atropine arresting the cutaneous secretion. With the dryness of the skin, in a very large percentage of cases, a scarlet rash occurs over most of the body. The temperature of the body in large doses is raised, in small ones somewhat lowered. The pulse is increased, being always over 100, and mostly from 115 to 120, or even 150, in the minute. The breathing is at first slower and then very rapid. Vomiting is not common. The nervous system is profoundly affected; in one case there were clonic spasms; in another, such muscular rigidity, that the patient could with difficulty be placed on a chair. The lower extremities are often partly paralysed, there is a want of co-ordination,* the person reels like a drunken man, or there may be general jactitation.† The disturbance of the brain function is very marked; in about 4 per cent. only of the recorded cases has there been no delirium or very little. In the majority, delirium is present. In adults this generally takes a garrulous pleasing form, but every variety has been witnessed. Dr. H. Girand describes the delirium thus: "He either vociferates loudly or is garrulous and talks incoherently; sometimes he is mirthful and laughs wildly or is sad and moans as if in great distress; generally, he

* Or control over the muscles regulating progression and the body, equilibrium.

† *Jactitation* is that restlessness and tendency to frequent changes of position that characterise severe distress in disease.

is observed to be very timid, and when most troublesome and unruly, can always be cowed by an angry word, frequently putting up his hands in a supplicating posture. When approached, he suddenly shrinks back as if apprehensive of being struck, and frequently he moves about as if to avoid spectra. But the most invariable accompaniment of the final stage of delirium, and frequently also that of *sopor*, is in the incessant picking at real or imaginary objects. At one time the patient seizes hold of parts of his clothes, or bedding, pulls at his fingers and toes, takes up dirt and stones from the ground, or snatches at imaginary objects in the air, on his body, or anything near him. Very frequently he amuses himself by drawing out imaginary threads from the ends of his fingers, and occasionally his antics are so varied and ridiculous, that I have seen his near relatives, although apprehensive of danger, unable to restrain their laughter." After this description of the symptoms, it is easy to understand in what horror the ancient *poust* was held, and why one of the young princes who had rebelled against Aurungzebe, when brought into the Emperor's presence, pleaded that he should rather be killed at once than made to drink *poust*.

Chronic poisoning by atropine.

734. Chronic poisoning by atropine, has been very common in India, and in those cases where the object was to bring on imbecility, continuous doses were administered, and the same has been attempted by servants against their masters in recent times (see Illustrative Cases). There are few characteristic *post-mortem* appearances in cases of poisoning from atropine, save in the fact that the pupils remain dilated. The brain is usually hyperæmic. The stomach and intestines may be somewhat irritated if the seeds, leaves, or other parts of the plant have been eaten, but the irritation is not constant if the poisoning has been by pure atropine, and still less likely to be present if atropine has been administered subcutaneously.

Treatment in atropine poisoning.

735. The great majority of cases recover under treatment. Emetics and stomach pump should be used, and

in England the favorite treatment is by pilocarpine,* a fifth of a grain being injected from time to time. The traditional treatment in this country is by the application of cold water to the feet. Morphia may be cautiously used as an antidote.†

736. There can be no doubt that a great many cases still occur in which datura is used upon travellers for purposes of robbery, though such cases are now of far less frequency than formerly. For some years after the suppression of thuggee, which crime was mainly carried out by means of strangulation, robbing, by means of administering drugs, for some time considerably increased. It probably still prevails in the wilder and more inaccessible parts of the country, but is on the decrease, owing to the opening out of communications and the better organization of the police. Still, not long ago a charge was made that such an offence had been committed on the railway between Madras and Bangalore—a complaint, by the way, which led to a charge against the police for torture in order to extort evidence. Remarks regarding datura.

737. The following table shows the number of cases of datura and atropine Poisoning in Madras for the five years 1885-1889 :—

		Number of cases in which poison was detected.	Number of cases in which death resulted.	Number of death reported.
1885	...	3	...	...
1886	...	4	1	1
1887	...	...	...	...
1888	...	3	...	...
1889	...	4	4	4
	Total	14	5	5

* *Pilocarpine* is the alkaloid obtained from the leaves of the *Pilocarpus permatifolius.*

† For an important instance, see Illustrative case XCVII.

Various appellations for Indian hemp or cannabis Indica.

738. Indian *hemp, Bhanga, Gunjika, Bijya* (Sans.), Bhang (Hind.), Ganjar (Beng.), Ganja, (Deccan Tam. Malay), Isjeroo-causjaiva (Mal.), Gangah (Tel.), Mat-Kausha (Cey.), Kinneb (Arab.), Bin (Burmah), Gunji-lacki-lacki (Malay), Kinnabis, Defroonus, Gonnanee, (Birdwood), Churrus and Momeea (the concrete resinous juice). Bhang, Subjee, Sidhee (the larger leaves and capsules without the stalks), Gunjah the dried plant which has flowered, and from which the resin has not been removed. The practice of smoking and eating the *gunjah* is of great antiquity and exceeding prevalence in the East.

Effects of cannabis Indica

739. The effects of Cannabis Indica are well described by Bandelaire. He divides the symptoms of hemp intoxication according to their intensity and importance into two classes. The first of these he speaks of under the name of the "theatre of seraphine". "This is merely a heightened and transformed state of ordinary consciousness in which surrounding objects are continually present in the mind; but furnish, as it were, the texture of a strange and variegated embroidery of fancy. In this stage of its influence, hasdeisch affects only the senses and the contents of the sensuous imagination. The first indication of the activity of the drug is a child-like gaiety and irresistible tendency to find comical resemblances and contrasts in everything which surrounds the patient a sense of the exquisite address of the most familiar words, things, and persons. A sort of courteous benevolence accompanies this state of feeling, founded on the persuasion that every one else is in the same state of sensitiveness and nervous tension as the patient himself. To this phase of humour and urbanity there succeeds, in the first place, an interval of tranquil rationality, which, however, is merely a prelude to further excitement. The extremities now become intensely cold, the limbs lax and inanimate. The eyes are enlarged and seem drawn in all directions by "an implacable ecstasy." The face loses colour and the lips are drawn inwards by a convulsive aspiration. Deep sighs escape from the chest, "as

though the old body could not bear the activity and desires of the new soul." The sensation of cold reached such a pitch in one case that the patient at last believed himself completely frozen, and felt an indescribable moral satisfaction in conceiving himself a statue cut out of a block of ice, though the time was summer and the place a crowded theatre. In this experience occurs the strange sensation—known to many persons as the result of late hours and an over-dose of tea—of seeing everything as through the big end of a telescope. The objects seen appear to be at an immeasurable distance, and yet perfectly distinct in outline and colour. The effect reminds one of Missonnier's pictures, or of a much reduced photograph of an engraving. The despotism of analogies, correspondencies, associations, profound meanings, and a whole universe of artificial mysticism, comes in at this stage. Then the intense sympathy with all these inner meanings of objects lead to a quasi-pantheistic identification with them. Thus, suppose you are smoking, you watch the curls of smoke, you sympathise intensely with the idea of slow, successive, eternal evaporation. In another moment, without ceasing to be the smoker, you begin to be the matter which is evaporated, and you feel yourself crouched together in the bowl of your pipe being smoked by yourself at the other end."

740. The practice of ganjah-smoking is ascertained to be the cause of a very large proportion of the cases of acute mania admitted to the native Lunatic Asylums of Bengal. Baboo Kanny Lall Dey showed, in 1868, that there were then in Calcutta twenty-three shops for the retail sale of ganjah, and eight others in the Suburbs. Ganjah-smoking.

741. It is probable that death may not unfrequently result from an over-dose of ganjah, but we have only met with two allusions to fatal cases. Baboo Kanny Lall Dey has made particular enquiry of some of the oldest ganjah-sellers in Calcutta, who are unanimous in declaring that they have never heard of an instance of fatal poisoning Fatal results.

by this drug. It may be said that these men have an interest in maintaining this view, but as no Native would make such an assertion regarding opium, we give their statement some weight.

Murder under influence of bhang.

742. The crime of murdering persons while intoxicated by hemp is one which might be expected to be of frequent occurrence among a people, the lowest and most depraved of whom are continually drugging themselves with this narcotic. We have, however, only met with one recorded instance, in which a man about seventy years old, living at Mynpoorie, was convicted of having murdered one Himmut Khan by strangling him while in a state of intoxication from the effects of *bhang*.

Curious case of poisoning.

743. The following case occurred to Assistant Surgeon Cockerell. A woman was sent, by the Sub-Magistrate, Itchapore, for his opinion as to whether she was really dumb or merely pretending; her friends said that she went out one day to the jungle in good health, but returned unable to speak. She intimated by signs that two men had caught hold of her, forced open her mouth, and put some powder upon her tongue; then holding a knife to her throat had robbed her. She called out at first and then lost her voice. The robbers, on being found, confessed, and were sentenced. She had no power of motion over her tongue, and could only swallow by throwing her food far back into the mouth and pushing it with her fingers.

Symptoms of tincture of cannabis on delicate women.

744. Dr. E. C. Bensley has noticed that very moderate doses of tincture of cannabis are liable to cause rather serious symptoms in delicate women in India—fainting followed by sopor and collapse, pallor, coldness of the surface, exceedingly weak pulse. See M. Bandelaire on the cold stage of haschish intoxication, and dilatation of the pupils,* *supra* p. 465.

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* CHEVERS *Medical Jurisprudence for India*, p. 219 *et seq.*

Cannabis used as an intoxicant.

745. The use of cannabis as an intoxicant is widely prevalent in India, the drug being either smoked—ganjah-smoking—or swallowed. Insanity in India is often attributed to indulgence in cannabis. According to Baboo Kanney Lall Dey, of 2,283 cases admitted in the Bengal Lunatic Asylums during the five years ending 1867, 878 or 38·4 per cent. were attributed to this cause. Apparently, however, many of these were simply cases of temporary intoxication from cannabis. Chevers remarks that "it is a matter of popular notoriety, both in Bengal and the North-West Provinces, that persons intoxicated with ganjah are liable to commit acts of homicidal violence. In some cases of homicide, committed or alleged to have been committed while under the influence of cannabis, one person only has been attacked. Usually, however, the victims are numerous, the case assuming the form known as "running amok." Cases of running amok, however, have been reported, in which the criminal has been under the influence of an intoxicant other than cannabis, and also cases in which the criminal does not appear to have been under the influence of any intoxicant. In running-amok cases, whether while under the influence of an intoxicant or not, usually the first individuals injured are persons with whom the criminal is at enmity. This, however, is not always the case. Commonly, when acts of homicidal violence are committed while under the influence of an intoxicant, some motive is traceable for the crime. In some cases the motive will, on inquiry, be found to have existed previous to the intoxication; and when this is so, there often appears to be reason to suppose that the intoxicant is taken by the criminal with the object of nerving himself for the deed. In other cases, the motive, such as it is, apparently comes into existence subsequent to the commencement of the intoxication. As already pointed out, the question of criminal responsibility for acts done while in a state of intoxication is not affected by the nature of the intoxicating agent. Hence, Sections 85 and 86 of the Indian

Penal Code apply with the same force to cannabis intoxication as they do to alcoholic intoxication.*

Aconite used as a poison.

746. In India, in the mountainous tracts of Tirhoot and in the hill districts generally, a paste made from aconite root is used by native hunters as an arrow poison. Chevers, quoting Wallich, mentions that the Burmese, during their retreat before the British, threw bruised aconite root into a water tank in the hope of poisoning the troops pursuing them. Aconite root (like dhatura) appears also to be occasionally used by Native liquor dealers for the purpose of conferring additional intoxicating power on alcoholic liquor, sometimes with fatal results. Cases of accidental poisoning by aconite are also occasionally met with, arising from the use of the drug by Native quacks as a remedy for fever, etc. Homicidal and suicidal cases are occasionally reported, but are not so frequent as one might expect, considering how readily the drug can be obtained and how well known are its poisonous properties. CHEVERS, for example, states that, during the ten years ending 1869, only thirty-six cases of aconite poisoning came under the notice of the Calcutta Chemical Examiner, and BURTON BROWN records only nineteen cases in the Punjaub in the years 1861-73. HARVEY, in his medico-legal report for Bengal, etc., for the three years ending 1872, records only ten certain cases (five of them homicidal) and five doubtful cases. Again, the Bombay Analyser's report for the ten years ending 1884 show only six cases, three of them accidental. In Europe, aconite is rarely used for criminal purposes. According to BLYTH, in the ten years ending 1882-83, eighty-seven cases of aconite poisoning were recorded in European medical literature, of which two were homicidal, seven suicidal, and seventy-seven accidental. It should be noted that, in Europe, accidental cases sometimes arise from aconite root being eaten by mistake for horse-radish.†

* LYON'S *Medical Jurisprudence for India*, 2nd ed., pp. 262, 263.

† LYON'S *Medical Jurisprudence for India*, 2nd ed., p. 287.

747. Opium contains a greater number of basic substances than any other plant known. The list reached at present includes eighteen or nineteen nitrogenised bases, and almost every year others are added there have been some additions. Some of these alkaloids exist in very small proportions and have been little studied. Morphine and narcotine alone are the toxicologically important ones. (BLYTH). Opium is a gummy mass, consisting of the juice of the incised unripe fruit of the *papaver somniferum*, or opium poppy, hardened in the air. Opium.

748. Medicinally, opium is more largely used than any other poison, and there is no object in enumerating all the different preparations in which it is employed. Most of these bear opium in their titles, but some *patent medicines*, such as "Nurse's Drop," "Dalby's Carminative," "Chlorodyne," "Atkinson's Infant Preserver," "Boerhave's Odontalgic Essence," "Godfrey's Cordial," "Black Drop," and "Nepenthe," contain the drug in large quantities without any such announcement. Medicinal use of opium.

749. In England, during the five years 1876-80, 393 males and 250 females died from some form or other of opium-poisoning; two only out of the whole number were cases of murder, and in both the victims were infants. 22·4 per cent. of the female cases and 30·5 of the males were suicidal. During the five years, opium accounts for 40·7 per cent. of the total number of deaths from poisoning (1,581). This percentage is far larger than that of any other European country. A very large proportion of the deaths occur amongst infants from the use of "Soothing Syrups," "Infants' Preservers," etc. In India, this kind of poisoning is also very frequent, more from carelessness than intention, in order to send children to sleep. But infanticide by poisoning with opium is not a very uncommon crime in India. In the Bengal Medico-Legal Reports for the three years ending 1872, HARVEY gives no fewer than 30 Statistics of opium poisoning.

cases of alleged infanticide by poisoning, and states that the greater number of these were probably by opium. But opium poisoning as above remarked occasionally occurs in children from the ignorant use of the drug. HEHIR mentions a case that recently came under his observation in which an infant of two months old, suffering from a bad form of bronchitis, had one grain of opium administered to it by its mother to relieve the cough. The infant died. Both parents were devotedly attached to this their only son, who was heir to a vast property.

Opium eating and opium smoking.

750. The habit of opium eating is more or less universal in India. The drug is usually consumed in the crude state. Sometimes, as in Rajputana, the watery decoction of opium (*kusumba*) is employed. Opium smoking is likewise very common, and for this purpose a watery extract of crude opium (known as *chandal*) is used. The question whether opium eating, opium smoking, etc., is or is not injurious to health has been warmly discussed for many years. There appears to be some authority for stating that when opium is used in small quantities, it neither tends to injure health nor materially shorten life. Its abuse—like the abuse of any other poison—produces indigestion, malassimilation, defective nutrition, and general impairment of health. As a matter of fact, the excessive use of opium is less frequently met with amongst opium-eaters than the excessive use of alcohol is amongst alcohol-drinkers. It is taken to produce a peculiar stimulation or excitement. A case is recorded by CHEVERS in which a man, said to be an opium-eater, previous to committing murder, swallowed a large dose of opium to give him nerve to perpetrate the crime. So large was the dose consumed that he died a few hours after committing the deed. We might here state that the use of opium in even a poisoning dose no more exculpates the *habitué* from the responsibility for any crime he may commit under its influence than the consumption of intoxicating doses of alcohol does under similar circumstances. The opium-eater is legally responsible for his crimes.

751. For adults, the ordinary dose of opium in the solid state is from one-fourth to one grain, and never exceeds three grains, except in the case of habitual opium-eaters; for children, rarely more than one drop of laudanum.

Ordinary dose of opium.

752. The smallest dose of solid opium known to have proved fatal to adults was, according to TAYLOR, four grains of crude opium, and the smallest dose, according to the same authority, was two drachms of the tincture.

Fatal doses of opium.

753. In Madras, during 1883, four cases came before the chemical examiner, in which opium was discovered in viscera or evacuations, and in 1882-83, seven cases. In Bombay there were seventeen cases in 1883, of which twelve (adults) appear to have been accidental or suicidal, and three cases of children, apparently from over-dose. In 1882-83 there were only two cases, of which one was fatal. One of these cases appears to have been homicidal. In Calcutta opium is one of the most common poisons used for suicidal purposes.

Statistics of opium poisoning.

754. BLYTH gives three forms of opium poisoning—(1) the common form, as seen in about 99 per cent of cases; (2) a very sudden form; (3) a very rare, entirely abnormal form, in which there is no coma* but convulsions. In the common form there are three stages—(*a*) excitement, (*b*) norcosis or stupor, and (*c*) coma. The first stage occurs in about half an hour, and during its prevalence, the action on the system is like that of alcohol: the ideas flow most rapidly, and, instead of sleepiness, the reverse is the case; it, however, insensibly, and more or less rapidly, passes into the next stage of heaviness and stupor. Then follows the sleepy stage—pulse and respiration is slower, often irritability of the skin and vomiting, if the poison has been swallowed, and constipation. In the last stage,

Symptoms of opium poisoning.

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* *Coma* is a condition of abnormally profound sleep with the cerebral functions in abeyance.

the patient sinks into complete insensibility. The sudden form is that in which the individual sinks into a deep sleep almost immediately, *i.e.*, within five or ten minutes, and dies in a few hours. Examples of the convulsive form are to be found only among opium-eaters, or persons under otherwise abnormal conditions. External applications to wounds, and liniments or poultices, have produced fatal effects.

Antidotes to opium poisoning.

755. Besides stimulating emetics and the use of the stomach-pump, atropine may be used as a physiological antidote. It is best administered by hypodermic injection and should be given in small quantities frequently repeated.

Post-mortem appearances of opium poisoning.

756. There appear to be no characteristic appearances after death, save hyperæmia of the brain and blood vessels of membranes, with generally serous effusion into the ventricles. The external surface is either livid or pale. "The lungs are commonly hyperæmic, the bladder full of urine, still in not a few cases there is nothing abnormal; and in no single case could a pathologist, *from the appearance of the organs only, declare the cause of death with confidence.*" (BLYTH).

Other vegetable poisons.

757. Among other vegetable poisons which may be identified by chemical or by physiological tests, are the following :—

Plumbago (P. Rosea and Zeylanica, N. O. Plumbagineæ) and *Oleander* (Nerium odorum and Thevetia nerrifolia, N. O. Apocyneæ), both of which are irritant poisons.

Andrachne Cadishaw or Lebedieropsis Orbicularis (Tam. Odwan, Nachutu), a euphorbiaceous shrub, which has recently been identified as the probable poison in some cases of irritant poisoning which occurred in the Madras Presidency.*

* To the above drugs should be added *Cocculus Indicus*.

758. In some cases, however, it should be remembered that a vegetable poison may be extracted from viscera or suspected substances, and its poisonous nature may be determined by physiological methods, while its exact source cannot be identified by any known chemical tests.

Remarks regarding poisons.

759. The following table gives the number of cases in Madras under various vegetable poisons for a period of five years (1885-89) :—

Statistics of vegetable poisoning.

		No. of cases in which poison was detected.	No. of cases in which death resulted.	No. of deaths reported.
Opium and Morphine.	1885 ...	5	2	2
	1886 ...	6	1	1
	1887 ...	1	...	...
	1888 ...	6	3	3
	1889 ...	7	6	6
Plumbago Zeylanica...	1885 ...	1	...	...
	1886 ...	...	...	...
	1887 ...	1	...	...
	1888 ...	2	2	2
	1889 ...	2	2	2
Oleander	1885 ...	1	1	1
	1886 ...	...	...	...
	1887 ...	...	...	...
	1888 ...	...	...	...
	1889 ...	...	...	...
Cocculus Indicus ...	1885 ...	1	...	...
	1886 ...	...	...	...
	1887 ...	...	...	...
	1888 ...	1	1	1
	1889 ...	...	...	...
Ganjah	1885 ...	2	1	1
	1886 ...	1	...	...
	1887 ...	1	...	...
	1888 ...	7	2	2
	1889 ...	7	3	3

ILLUSTRATIVE CASES.

Case No. LXXXIV.—Dr. Lamson's case.

Dr. Lamson was charged with the murder of his brother-in-law, Percy Malcolm John, in 1882. Deceased was a weakly lad, of about eighteen, and was a cripple from spinal disease, being paralysed in his lower limbs. By his death, Lamson's wife would have inherited the sum of £1,500. In November 1880, Lamson purchased two grains of aconitia, and a few days afterwards went to the school where the lad was placed, had an interview with his brother-in-law, and, in the presence of the head-master, gave the boy a capsule, which he filled then and there with some white powder, presumed to be sugar. Lamson only stayed altogether twenty minutes in the house, and directly after he saw the boy swallow the capsule he left. Within fifteen minutes the boy became unwell, saying that he felt as if he had an attack of heart-burn, and then that he felt the same as when his brother-in-law had, on a former occasion, given him a quinine pill. Violent vomiting soon set in, and he complained of pains in his stomach, a sense of constriction in the throat, and of being unable to swallow. He was very restless, so much so, that he had to be restrained by force from injuring himself. There was delirium a few minutes before death, which took place about three hours and three-quarters after swallowing the fatal dose. The *post-mortem* appearances essentially consisted of redness of the greater curvature of the stomach and the posterior portion of the same organ. In one part there was a little pit, as if a blister had broken, the rest of the viscera were congested, and the brain was also slightly congested. Drs. Stephenson and Duprè conducted the chemical examination. The process need not be here described, but the result was, an extract from the vomit, the stomach, liver, spleen and urine, of an alkaloid, which, on being tasted, caused numbness to the tongue, and which, on being injected into the skin of a mouse, caused death in two minutes. This alkaloid was held to be aconitine. Lamson came over from France and gave himself up for trial. In his defence, it was urged, that there was not sufficient evidence to prove that the alkaloid was aconitine, and that it might have been cadaveric ; that the experiment on a mouse was not sufficient, since mice are so timid that they sometimes die from an injection of pure water. He was convicted, and an attempt was afterwards made to get him off on the ground of insanity. It was urged that he had long been very eccentric, was in the habit of using enormous doses of morphia and opium as hypodermic injections, and had for a long time had a morbid habit of prescribing dangerously large doses of aconite for almost every disease. The Home Secretary refused to interfere and he was executed.

Case No. LXXXV.—Effects of Mowah Flower Liquor.

In 1834, *seventy* men, who had been drinking the intoxicating liquor prepared from the *mowah* flower *(Bassia latifolia)*, at a Native spirit shop in Benares, were attacked with symptoms of poisoning. Forty-three were brought to hospital and eighteen died outside. There was a sense of constriction and burning at the upper part of the œsophagus, twisting of the tongue, in some instances protrusion; cramps in the legs and arms; pulse small and weak, and in none exceeding sixty-five; in some it was imperceptible. The treatment was, removing the poison from the stomach, and administering ammonia. All who were treated recovered by next day. One of the servants of the shop, who had disappeared, subsequently confessed that he had put *singhera* into the pots in which the mowah flower had been steeped.

Case No. LXXXVI.—Aconite Poisoning.

In 1854, one Anund Chunder Roy, having incurred the censure of his family, by his dissipated and extravagant life, conceived the idea of murdering them all. For this purpose he purchased about an ounce of the aconite root. He was seen pounding some of the root on a brick, and was proved to have deposited the powder in a utensil, containing a vegetable broth, at his brother's house. The brother and three women partook of the broth. The man ate first, and probably got the largest share of the broth and the poison. He was taken ill almost immediately, complaining of a burning sensation in his throat and stomach, vomited once, and died during the night. The three women were seized with the same symptoms, and soon fell into a state of insensibility, but recovered. The prisoner at first ascribed these events to cholera. A boy, son of deceased, swore that he had seen the prisoner put something into the cooking vessel. The civil surgeon examined the body and deposed that "he was unable to account for the death on any supposition other than that the deceased had swallowed some vegetable poison, as, for instance, aconite." The prisoner was sentenced to death. Several other instances could be given, but the foregoing seem sufficiently to illustrate the action of the poison and the difficulty of its detection.

Case No. LXXXVII.—Strychnine or Nux Vomica Poisoning.

In 1853, a man in Goruckpore drank off a bottle of common bazaar spirit. He at once remarked: "Something is wrong, as this *sharab** is very bitter." Soon afterwards spasm came on, and frightful convulsions; there was perfect opisthotonos† of the body. Intellect was entire throughout. On the abatement of the convulsions, coma set in, and he died in three-quarters

* Wine or spirituous liquor, the term being used indifferently for many kinds of alcoholic beverages.

† *Opisthotonos* is a prolonged tetanic contraction of the muscles, particularly those of the back, whereby the body is bent rigidly forwards and the extremities backwards.

of an hour. In the stomach a trace of strychnine was found, and it was discovered that the Natives in the bazaar were in the habit of mixing the powdered bark of the nux vomica when distilling the spirit.—CHEVERS.

CASE No. LXXXVIII.—STRYCHNINE OR NUX VOMICA POISONING.

DURING the autumn of 1840, a European sailor, who was being treated in the Calcutta hospital, was given some of the *viscum monoicum* or *kuchla molung* (a powder made from a parasite which grows on the *nux vomica* tree) in mistake for cubeb powder. He swallowed the contents of one of the packets, mixed with a little water, and immediately fell back screaming, "I am poisoned." From that moment, until the time of his death, four hours afterwards, he never uttered another word, every attempt at speech being frustrated by the most violent fits of convulsions. The paroxysms recurred about two or three times every minute, and each time lasted about ten or eighteen seconds, and during the time six bearers were unable to keep him in the bed. The stomach-pump could not be used as every touch on the body accelerated the return of the convulsions, and put the patient to the most agonizing tortures. The sitting of a fly on the body had the same effect. An attempt was made to administer anodynes, but with no effect, and he died at 1 P.M., after suffering the most excruciating pain for four hours.—CHEVERS.

CASE No. LXXXIX.—DEATH FROM TETANIC SPASM.

IN the trial of Palmer there was a great enquiry for the case of a person who had died in the first spasm of the disease tetanus. No properly authenticated case was found, but Chevers gives one which occurred in the experience of Dr. Webb, whilst in charge of La Martinière school, Calcutta: "An apparently healthy boy, one of the pupils, was seated on the bed, having a small sore on his foot dressed by the Native Doctor. Having applied the dressing, the doctor was leaving. He walked straight to the door, but as he was passing out, he heard a noise from the bed. Turning he saw the boy supported on his head and his heels, the body being arched up in oposthotonic spasm. He ran to the bed, the body sank, and death was immediate." It is to be regretted that more information is not available regarding the nature of the sore which led to this remarkable case, which seems to be unique of its kind. Could these symptoms have been produced by strychnine having been mixed in the dressing by mistake?*—CHEVERS.

CASE No. XC.—STRYCHNINE POISONING.

HOWEVER striking and well-defined the picture of strychnine tetanus may be, mistakes in diagnosis are rather frequent, especially when a medical man is hastily summoned, has never seen a case of similar poisoning, and

* Dr. VanGeyzel suggests the following:—
"Probably reflex action by irritation of exposed nerve in the wound."

has no suspicion of the possible nature of the seizure. In a painful case in which the author (BLYTH) was engaged, a young woman either took, or was given (for the mystery was never cleared up fully), a fatal dose of strychnine, and though the symptoms were well marked, the medical attendant was so possessed with the view that the case was due to hysteria, that even after making the *post-mortem* examination, and finding no adequate lesion, he theorized as to the possibility of some fatal hysteric spasm of the glottis, while there was ample chemical evidence of strychnine, and a weighable quantity of the alkaloid was actually separated from the contents of the stomach.—BLYTH.

CASE No. XCI.—RECOVERY FROM LARGE DOSES OF STRYCHNINE.

TAYLOR says: "There are at least three instances on record in which persons have recovered after taking one grain of strychnine. A case of recovery from two to three grains is recorded (*Lancet*, 1861, II, p. 169). A girl recovered in six or seven hours from a dose of four grains of strychnine (*Ibid.*, 1863, I, p. 134). There is one instance reported in which a person is said to have recovered from a dose of *seven* grains of strychnine (*Med. Gaz.*, vol. 41, p. 305)." In this case, however, the poison was probably mixed with some other substance, and if, as in the case given in the text, it had been mixed with a narcotic (the case of the *Suicidal Chemist*), the one poison possibly counteracted the effects of the other.

CASE No. XCII.—DHATURA OR CANNABIS INDICA POISONING.

IN 1852, two men, Bhowany (this name is significant as being that of the goddess of the Thugs) and Bhola, his nephew, were tried at Meerut, on the accusation of a man, who deposed that, when on his way to Lucknow, he met Bhowany at Umballah, who said he would travel in company with him. On their way, Bhowany took him to a *bunneah's* shop and purchased some atta* and dhall.† After cooking it, the complainant, at Bhowany's request, went for some water; on his return, he ate the food and became insensible. Bhola, who had lately joined them, was present. Bhowany then placed the man in a hut, they robbed him, and pretended to the police that their party consisted only of two. The police found the complainant insensible and concealed in a corner of the hut. A bag of dhatura seed was found on Bhowany, and some concrete juice of the *Cannabis Indica* or Indian hemp. The prisoners mutually accused each other. Sentence, fourteen years' imprisonment.—CHEVERS.

CASE No. XCIII.—DHATURA POISONING.

A PROSTITUTE, named Durbarun, who gained her livelihood by singing, was proceeding from Meerut to Allyghur, accompanied by her mother and six

* *Atta*, coarse wheaten flour.

† *Dhall* is a generic term for several varieties of pulse grown in this country.

other persons. They were met on the way by one Koda Buksh, who appears to have had some acquaintance with the party at Meerut. He said that he was in want of service, and was engaged by the woman as cook to the party. On arriving at Coel, they put up in a *serai*, and the prisoner was given food to cook. This was eaten about nine in the evening. At midnight, the chowkedar of the *serai* observed some of the party rolling about the ground; he went up and found them all, more or less, affected by some intoxicating drug. The prisoner lay among them feigning sleep, and some jewels belonging to the prostitute were found on his person. Four of the men were sent to the dispensary and recovered in three days. The others, who had eaten less, recovered after an emetic had been given. The prisoner confessed having got some dhatura from a neighbouring garden. Sentence, fourteen years' imprisonment.—Chevers.

Case No. XCIV.—Dhatura Poisoning as a Profession.

In 1868, the *Police Gazette*, N.-W. P., published the confession of one Ramadheen, not quite twenty-one years of age, who had adopted dhatura poisoning as a profession. He spoke of his victims without the slightest remorse, and looked upon them as shikar or sport. As far as he could remember, he had, during a year and a half, poisoned about twenty-seven persons, but as he spoke very vaguely of families and persons, not much reliance could be put upon his figures, more or less. Altogether there can be no doubt, that the tradition of dhatura-poisoning, for the purposes of robbery, is still strongly implanted in the criminal classes. With poisons of every kind so easily accessible, with so many opportunities in a country which, in parts, is thinly populated and elsewhere densely over-crowded which is everywhere liable to sudden outbreaks of violent epidemics, and in which, except in a few centres, there is no skilled medical attendance, it seems by no means improbable that a large number of deaths are annually ascribed to fevers, snake-bites, and accidents, which, in reality are due to homicides by poison.—Chevers.

Case No. XCV.—Dhatura Poisoning.

This is a very peculiar case of a European gentleman residing at Mussoorie, who, in 1868, appears to have been poisoned by repeated doses, of dhatura. For several days he was in a semi- intoxicated state, apparently quite out of his mind. The symptoms were all of dhatura-poisoning, though not at first recognized as such. He afterwards recovered. In this case the servants first expressed a suspicion that their master had been poisoned, and it is not explained who should have administered the poison or for what reason.—Dr. D. B. Smith.

Case No. XCVI.—Dhatura Poisoning.

Another case is recorded by Chevers, in which, in 1865, a gentleman employed in the railway, a Mr. Uppham, says that he saw, from a distance

of ten paces, his servant pounding the dhatura fruit, which one of them had got from a tree close by his house, and squeezing the juice through a towel into his stew. He called for the stew, as if to partake of it, but after a little while told his *khitmutgar* that he was not hungry, and to keep the stew on the table for breakfast next morning, resolving to make it over to the railway doctor next day. That night he wrote a letter to the doctor, to be despatched the next day. Next morning, however, he called for *chota hazree*, partook of tea and hand-cakes, and then mounted his horse and rode to the doctor's. He was obliged to halt at a bungalow, on the line, as his head felt affected. Mr. Augier, the occupant of the bungalow, took him in and called another person, but neither could make out what was the matter with Mr. Uppham, for he reeled to and fro like a drunken man, and yet was not drunk. They called in the doctor, but he was at a loss to discover the cause of indisposition; the patient was talking incoherently, going reeling about the room, and every now and then squeezing and twitching his coat-tail, and looking about the room as if to illustrate his meaning still further. After recovering from the stupor, next day, Mr. Uppham left for home, and returned shortly after with a fruit from the same dhatura tree; the doctor then of course had no doubt on his mind that dhatura had been administered to Mr. Uppham. Before the magistrate who committed the prisoners to the sessions, one confessed to having taken the fruit from the tree alluded to by Mr. Uppham, another confessed to its being pounded and made over to the khitmutgar, but he said that he did not give it to his master but used it himself for ear-ache. Verdict not recorded.

Case No. XCVII.—Morphine as an antidote to Atropine.

The following interesting case occurred in Hyderabad in March 1890. The extract is from a report in the *Indian Medical Record* for May of that year's. A case of considerable interest and of unique characteristics occurred at Chudderghaut, in Hyderabad, a few days ago. A Medical student named Richard M., the son of Dr. M., of the Nizam's Service, who was a great sufferer from neuralgia, for which he was accustomed to take antipyrin,* went to indulge in his customary dose, but hit upon the wrong bottle, and took four grains of Atropine instead of Antipyrin. In a few moments he became unconscious and fell. He was seen by a brother medical student, who instantly ran off and called Dr. Edward Lawrie, who quickly came and was assisted by Dr. Hehir and Mrs. Dora Fellowes. An emetic was speedily given, and the stomach pump used to wash out the contents of the stomach. The patient, however, seemed to be rapidly sinking from the profound narcotism of the drug. The pupils were dilated to their fullest extent, there was foaming at the mouth, and sterterous respiration, and a rapid intermitting pulse. M.'s condition seemed hasten-

* *Antipyrin* is one of the products of the destructive distillation of coal tar. It is largely used in relieving headache, and also for lowering the temperature in fevers.

ing towards the end, when Dr. Lawrie thought he would resort to the antagonistic effects of morphine, and quickly injected one grain of this drug subcutaneously, with no apparent effect. He then injected another grain, but with no decided result. The patient, though still alive, seemed hovering in the balance between life and death. From 8 o'clock in the morning till three in the evening, artificial respiration was resorted to with varying intervals of rest. Dr. Lawrie now determined to try the hypodermic injection of a third grain of morphine, and this seemed to be the determining antidote, for in an hour the pulse improved, the breathing gradually resumed its normal standard, and consciousness returned. The case is without a parallel in medical history, and points triumphantly to the truth of the experimental deduction of those able therapeutists who have laboured to prove that atropine poisoning can be counteracted by poisonous doses of morphine.

CHAPTER VI.

ANIMAL POISONS.

Amphibia—Scorpions—Centipedes and spiders—Bees, wasps, and hornets—Lizards—Poisonous fish—Shell fish—The globe fish—Varieties of fish poisoning—Sea-snakes—Flesh of diseased animals—Cysticerci—Septic poisons—Cantharides—Ptomaine poisoning.

THE following are the subjects belonging to the Animal Kingdom from which poisons are derived :—

760. Amongst the poisonous *Amphibia* are salamanders and toads. From the former, the poison called *salamandrine* is obtained from the juice of the skin glands of the *Salamandra maculosa* and the water salamander *(Triton cristatus)*. When injected into rabbits, dogs, and frogs, it produces paralysis, tetanus, and death. The secretion of the skins of toads produces an alkaloid named *phrynine*, which is poisonous to all animals experimented on except toads. Administered to frogs, it causes rapid paralysis of the heart and the breathing soon afterwards ceases, while the muscles become rigid early. Amphibia.

761. At the end of the tail of the *scorpion* there is a sting having a small central canal. Through this canal (which communicates with the poison-secreting organ) the poison is conveyed to the part stung. The pain produced is sometimes intense. Harvey (in the reports frequently alluded to in these pages) gives five instances in which the effects of the sting produced death in children. Stings by the larger forms of scorpions have produced death in adults. Scorpions.

762. *Centipedes* and some forms of *Spiders* likewise possess an apparatus for secreting poison and conveying it to the part stung by means of their mandibles or jaws. The effects are similar to those of scorpion stings. The Centipedes and spiders.

poison from some forms of spiders is of a very virulent nature, and has caused death even in adults.

Bees, wasps, and hornets.

763. *Bees, wasps,* and *hornets* have similar stinging appendages. Many cases are on record where swarms of bees from a hive have attacked people and produced serious results, and in some cases have caused death. Should even one of those insects get into the throat or sting the parts about the glottis, death from suffocation, resulting from œdema-swelling, may take place. Occasionally, it has happened that poisonous wasps, bees, spiders, etc., have been used for purposes of torture, but in such cases the medical jurisprudent could add little to the weight of the evidence produced. The usual treatment for such stings is the application of ipecacuanha paste or hartshorn.* When the pain is very severe, the hypodermic or endermic use of a quarter of a grain each of the hydrochlorates of morphine and cocaine relieves it. This latter is only to be used in the case of adults, and morphine when administered to children must be given in comparatively small doses and with the utmost caution.

Lizards.

764. None of the *lizards* met with in India are venomous, notwithstanding popular opinion to the contrary.

Poisonous fish.

765. With reference to the subject of *poisonous fish*, we may allude to the scare in Madras and Pondicherry in 1883 regarding the poisonous character of parasites in fish. The matter was made the subject of a very full enquiry by Dr. FURNELL, the Sanitary Commissioner, the result being that the parasites were discovered to be harmless. Professor COBBOLD, who was communicated with, wrote : "All your marine fishes have *entozoa*,† but probably none of them are injurious to man." All these parasites are killed by cooking. CHEVERS speaks of a case reported to him from Pondicherry in 1861, in which a family of three were attacked with vertigo and very great feebleness in the

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* Solution of ammonia.

† *Entozoa* are animals that live within other animals.

limbs after having eaten of a curry made of the *Gobus criniger.* Dr. Collas made some experiments with the fish, and found that it caused the death of several fowls, two only which had eaten the caudal portions of the fish escaping with life. Dr. Collas also ascertained that native females, before cooking this fish, "take extreme care to remove the head and intestines and to wash the fish thoroughly." TAYLOR suggests that the cause of certain fish being sometimes poisonous in tropical seas may, perhaps, be assigned to the nature of the food (acrid mollusca). CHEVERS mentions a case in which eleven girls were poisoned by eating a *Rohee* fish caught in their own tank. This fish is a common article of food. The girls recovered. Some fish, says BLYTH, possess, in portions of the body, a property which produces, when eaten, all the effects of poisons. This is true, for example, of the perches, gurnards, flounders, spares, gobies, sardines and globe fishes (the last including two forms), the *diodon* and *tetrodon.* The parts most dangerous are the spawn and the liver. Not a few fishes can be eaten safely when young, but afterwards they become unwholesome, as, for instance, the *Lethrinusmambo.* Sometimes it would seem that a poisonous property is imparted to an otherwise wholesome fish from its food, thus it has been noticed that the *Meletta venenosa* is only poisonous when it feeds on a certain green monad. TAYLOR quotes a case which occurred to Mr. MAUNDER (*Lancet,* July 30, 1864). A man, aged 35, ate a portion of a mackerel and complained of not liking it. On the third day an eruption broke out and on the ninth day he died.

766. Of all the varieties of shell-fish, the common *mussel* appears to be the most dangerous. Two cases are quoted by CHRISTISON which proved fatal—one in three and the other in seven hours. The symptoms of this particular poisoning are uneasiness and sense of weight in the stomach; numbness in the extremities; heat, dryness, and constriction in the mouth and throat; thirst, shivering, Shell-fish.

difficulty of breathing, cramps in the legs, swelling and inflammation of the eyelids, with a profuse secretion of tears, and heat and itching of the skin, followed by an eruption resembling nettle-rash. These symptoms are sometimes accompanied by colic, vomiting, and purging. The symptoms may come on in a few minutes or not till twenty-four hours. The usual symptoms of poisoning by fish are those of an irritant poison—nausea, vomiting, diarrhœa, great depression of the pulse, and painful cramps in the limbs. There may be swelling and inflammation of the eyelids, with profuse "watering of the eyes," accompanied by irritation of the skin, associated with an eruption like nettle-rash. In some cases muscular debility, numbness of the limbs, delirium, and coma take place. Death may occur within an hour or in several days.

The globe fish.

767. The globe fish appears to possess peculiarly poisonous properties, especially in the liver, and BLYTH quotes, from the *Linnæan Transactions* for November 1860, the case of a fatal accident that occurred on board the Dutchship *Postillion* at the Cape of Good Hope. The boatswain and purser's steward partook of the liver of the *toad* or diodon. Within twenty minutes the steward died. In ten minutes the boatswain was violently ill; the face flushed, the eyes glistening, and the pupils contracted; there was cyanosis of the face, the pulse was weak and intermittent, and swallowing was difficult; the breathing became embarrassed, and the body generally paralysed. Death took place in seventeen minutes. The liver of one fish only is said to have been eaten. This might weigh four drachms. If the account given is literally correct, the intensity of the poison equals that of any known substance.

Varieties of fish poisoning.

768. Apparently, cases of fish-poisoning are divisible into three classes—(1) exceptional cases attributable to idiosyncrasy, the fish eaten proving poisonous only to the individuals attacked and not to others; (2) cases arising from

fish usually non-poisonous, apparently due to the assumption by the fish of a condition in which it acts as a poison to all. Various theories have been put forward to account for the assumption of this condition. Thus, it has been attributed—(*a*) to the presence in the fish of copper derived from the copper sheathing of vessels, etc.; (*b*) to the fish being in spawn; (*c*) to the poisonous nature of food (*e.g.*, acrid mollusca or acrid spawn) eaten by the fish; and (*d*) to the development of a poison by decay. Cases of these first two classes appear to be most frequently due to shell-fish, especially mussels and oysters, but have arisen from other shell-fish and from herrings, eels, mackerel, etc. (3) Cases arising from eating fish, certain parts of which seem to be, especially in hot climates, nearly always poisonous.

769. The *sea-snake,* found in the Bay of Bengal and Indian Ocean, and which is frequently brought up by the fishermen in their nets, is very poisonous. A case is recorded of a sailor in the Madras Roads who was bitten by a sea-snake about seven feet six inches long, which had been caught from the side of the ship. The man at first took no notice of the bite, but about two hours afterwards he was attacked with symptoms not unlike those of hydrophobia and died in an hour and a half, or in less than four hours from the time he was bitten. The bite was on the index finger. Sea-snakes.

770. Consumption of the flesh of *diseased animals* may produce symptoms similar to those of some of the alkaloidal vegetable poisons. *Semi-putrid* or *decomposing flesh* may have the same effects as diseased flesh. In the case of diseased flesh the symptoms may be produced by parasites in the meat. In India the chief parasites met with in diseased flesh are the cysticerci of the tape worm known as the *Tænia Mediocanellata.* Flesh of diseased animals.

771. Cysticerci are the larvæ or embryonic forms of the various kinds of tape-worm. They may be found in the flesh of all animals, but chiefly in that of the pig and cow. Cysticerci.

The flesh is then said to be "measly." The cysticerci appear as minute bladders or vesicles, each having the head and hooklets of the future tape-worm.

Septic poisons.

772. Septic poisons, or such as are supposed to act by destroying the vitality of the blood, have but little interest to the medical jurist in India except when they give rise to septicæmia or pyæmia as the result of wounds or other injuries (*vide* Chapters VIII and IV.)

Cantharides.

773. *Cantharides* is used medicinally in the *British Pharmacopœia*, and it, or the Indian *Mylabris Cichorii*, is also largely used by Native doctors and quacks, especially as an aphrodisiac, and occasionally causes death. It is likewise occasionally used for the purpose of producing abortion. On the whole, cases of cantharides poisoning are rare. It is difficult to state the amount of a fatal dose of cantharadin. The smallest dose of the tincture which has proved fatal was an ounce (TAYLOR), equal to about ·25 grains of cantharadin. There have, however, been recoveries from much larger doses. If taken in small quantities there ensues immediately a feeling of warmth in the mouth and stomach, salivation, pulse more frequent than in health, a pleasant feeling of warmth all over the body, and some sexual excitement lasting some hours. In half an hour there is abdominal pain, diarrhœa, and tenesmus or straining at stool, and frequent, painful micturition. These symptoms subside in a few hours, but there is loss of appetite and pain about the kidneys, lasting until the following day. In large quantities the symptoms have been as follows (whether fatal or not): Immediate burning in the mouth and throat, extending to the stomach and alimentary canal, and increasing in intensity until there is considerable pain. Then follow salivation, difficulty in swallowing, and vomiting, irritation of the bladder, priapism,* and strangury† are all present. The vomited matters may contain

* *Priapism* means continued erection of the penis.

† Difficult and painful micturition.

the green the shining particles of the wings of the Spanish fly which show the nature of the poison. The pulse is accelerated, the breathing disturbed ; there are pains in the head, and often dilated pupils, giddiness, insensibility, delirium, and convulsions. The desire to micturate is urgent, the urine generally bloody and contains pus. In the *post-mortem* examination, the mouth will be found swollen, tonsils ulcerated, the gullet, stomach, and intestines inflamed, and the mucous membrane of the intestines covered with purulent matter. There is sometimes perforation. In all cases there is inflammation of the kidneys and urinary passages.

Ptomaine poisoning.

774. *Ptomaines* is the name given to the alkaloids which are products of decomposition of animal tissue after death, and are here alluded to simply because a question may sometimes be raised, as in the *Lamson* case (*see Aconite Poisoning*), whether the alkaloid found in a *post-mortem* is not of cadaveric origin. All putrefying animal substances contain more or less poisonous matter, and the subject of cadaveric or *post-mortem* alkaloids has as yet not been completely studied. It has been asserted recently that toxic principles in minute quantities may be separated from the urine and saliva of healthy persons, and it is supposed that, in the case of disease, the blood may become loaded with excrementitious matters and the poisons be thus self-produced. BLYTH cites a case of a young woman who died whilst suffering under diabetes with symptoms of narcotic poisoning, and Selmi has found poisonous principles in the urine in other diseases. Cadaveric alkaloids, however, exist in such extremely minute quantities that they can rarely affect the detection of poisonous vegetable alkaloids by chemical or physiological tests. The subject of ptomaines scarcely comes within the scope of this work, although it may be remarked that, in 1871, some rice, contaminated with cholera poison, propagated the disease to seventy-three person (*Lancet*, September 21 and 28, 1878).

CHAPTER VII.

SNAKE-POISONS.

Snake-poisons—Poisonous snakes—Classes of poisonous snakes—Poisonous colubrine snakes—Viperine snakes—Terrestial snakes—Indian snakes—Action of snake-poison—Action of snake-poison on nervous system—Action of snake-poison on blood—Transmission of snake-poison—Treatment of snake-bite—Condy's Fluid renders snake-poison inert—Only method of treatment of snake-bite—Cure for snake-bite—Mechanical irritants—Pounded glass as a mechanical poison—Diamond dust as a mechanical poison—Chopped hair as a mechanical poison.

Snake poisons.

THE poison of snakes, especially that of the *cobra*, is amongst the most poisonous agents known. In India, a large number of deaths are every year reported as due to snake-bites. Statistics collected by Fayrer show that in certain Indian Provinces 11,326 deaths from this cause were reported during the year 1869, equal to a death-rate of about 93·5 per million of population. In the provinces included, the death-rate from snake-bite varied from 43 per million (Punjaub) to about 128 per million (Bengal). In one district of Bengal, *viz.*, Burdwan, the snake-bite death-rate appears to have been as high as 173 per million. It is quite possible, of course, that some of the deaths reported as due to snake-bite were due to other causes, and the cases reported as snake-bite, either because the true cause of death was unknown or with the view to conceal the real cause of death. Thus, HARVEY mentions a case where the body of a man was sent for examination, accompanied by that of a snake which it was alleged had bitten him and caused his death. On examination the snake proved to be a non-poisonous one and the cause of death strangulation, the case being one of murder. It is very seldom that death from

snake-bite is other than accidental. CHEVERS points out, however, that homicide by snake-bite is mentioned in Hindu and Mahomedan law, and that formerly, in India, criminals were sometimes executed by snake-bite. Apparently, only one proved case of homicide by snake-bite has in recent times been recorded.

775. Poisonous snakes are distinguished from non-poisonous snakes by possessing poison fangs. These are long, sharp, and curved teeth, either grooved or tubulated, the groove or tubulure communicating by a duct with the poison gland, situated behind the eye. On each side there is only one active fang, but a number of reserve rudimentary fangs lie near it enclosed in a fold of mucous membrane. The active fangs are firmly fixed to the maxillary or jaw bones, which, with the exception of the pre-maxillary, are the most anterior of the bones forming the upper jaw. When the active fang is lost, one of the reserve fangs takes its place and functions. In poisonous snakes the maxillary bones are short, and carry either the poison fang (and reserve fangs) only, as in the viperine snakes; or, as in the poisonous colubrine snakes, other teeth as well, posterior to the poison fang—always, however, few in number. In non-poisonous snakes the maxillary bones are long and carry numerous teeth—as a rule, all of equal size, but in a few the most anterior of the maxillary teeth are larger than the rest and resemble poison fangs, but do not, of course, communicate with a poison gland. In addition to the teeth carried by the maxillary bone, both poisonous and non-poisonous snakes have a row of teeth on each side of the middle line of the palate, posterior and internal to the maxillary bones. Hence the upper jaw of the non-poisonous snake has on each side two rows of numerous teeth, while in poisonous snakes the outer row is represented by the poison fang only (viperine snakes), or by the poison fang and one or two other teeth (poisonous colubrine snakes).

Poisonous snakes.

Classes of poisonous snakes.

776. Two classes of poisonous snakes exist, *viz.*, (1) poisonous colubrine snakes, and (2) viperine snakes. The points of distinction between these are shown below :—

Poisonous Colubrine Snakes.	*Viperine Snakes.*
Head small and covered by large non-imbricated scales or shields.	Head broad and triangular, and, as a rule, covered with small scales.
Maxillary bone carries other teeth few in number, as well as the poison fang.	Maxillary bone carries the poison fang only.
Body, as a rule, long.	Body, as a rule, short.

Poisonous colubrine snakes.

777. The poisonous colubrine snakes are divided into *hydrophidæ* or sea-snakes, known by their flattened-out tail, and *elapidæ* or land-snakes. These last are again subdivided into *najidæ* or snakes with hoods, and elapidæ or snakes without hoods. Several members of the family hydrophidæ are found on the Indian coasts; all are very poisonous.

Viperine snakes.

778. The viperine snakes are divided into viperidæ or vipers, and crotalidæ or pit vipers, so called from their having a deep pit on either side of the head, between the eye and the nostril.

Terrestial snakes.

779. The Indian terrestial snakes include—

(1) *Najidæ, of* which there are two genera, each represented by a single species, *viz.*,—(*a*) *Najatripudians* or cobra de capello, common all over India; and (*b*) *Ophiophagus elaps, Hamadryad,* king cobra, or *sunkerchoor,* resembling the cobra, but larger widely distributed like the cobra, but less common.

(2) *Elapidæ,* of which there are three Indian genera, *viz.*,—(*a*) *Bungarus,* of which two species are

common in India, *viz.*, *Bungarus cœreulus* or krait, a snake of medium size, white below bluish black or brownish black, with narrow white transverse streaks above—probably, according to FAYRER, next to the cobra, the snake most destructive to human life in India; and *Bungarus fasciatus* or *sankin*, larger than the last, and known by its peculiar coloration, consisting of alternate transverse bands of black and yellow surrounding the body; (*b*) *Xenurelaps*, of which only one species is known, *viz.*, *xenurelaps bungaroides*, apparently somewhat rare; and (*c*) *Callophis*, a genus of colubrine snakes of small size, with short fangs, of which several species exist in India.

(3) *Viperidæ*, of which there are two Indian species *viz.*,—(*a*) *Daboia Russellii* or *D. Elegans*, the chain viper, *Bora genus* or *Tic polonga*, a large very deadly viper of a light-brown colour, having along the back three rows of large, black, white edged, ovate or circular rings—common in Bengal, and found also in many other parts of India; and (*b*) *Echis carinata*, *Afœ*, *Phoorsa* or *Kupper*, smaller than the last, brown or brownish-grey in colour; marked along the back, with a row of white brown-edged marks, with whitish curved bands on either side and on the belly with numerous small dark spots; found in the Bombay Presidency, Sind, and other parts of India.

(4) *Crotalidæ*, of which there are four Indian genera, *viz.*,—(*a*) *Trimeresurus* of which several species are found in India; many of the most common species are green in colour, and live among the leaves and branches of trees, *e.g.*, the *Trimeresurus anamallensis* common on the Ghauts,

near Bombay; (*b*) *Peltopelor*, of which one species only is known, *viz.*, *Peltopelor macrolepis*, a green arboreal crotalus, common in some hill districts; (*c*) *Halys*, of which two species are found in some of the hill districts, *viz.*, *Halys elliotti*, green above and white beneath, and *Halys himalayanus*, dark brown on greenish brown; and (*d*) *Hypuale*, of which one species only is known—Hypuale nepa, or carawilla, a small crotalus found in Southern India, brown, grey, or reddish-olive in colour, with a double row of dark spots on the back sometimes joining across the back and forming transverse bands.

Indian snakes.

780. It may be mentioned that the very poisonous American rattle-snakes, not found in India, are crotalidæ. Of the more commonly met with Indian terrestial snakes, the most poisonous are the *najidæ and daboia*; next to these comes the *krait*; less poisonous than these are the sankin and *phoorsa*; and the least poisonous of all are the *callophides* and *crotalidæ*.

Action of snake-poison.

781. Snake venom has both a local and a remote action. Locally, it acts as an irritant, and hence, when introduced into a wound, causes immediate burning pain in the wounded part, followed by swelling and inflammation. Even when applied to membranes such as the conjunctiva it acts as a local irritant. Its remote action is exerted either on the nervous system, or on the blood, or on both; and may not only be the result of its absorption into the system from a wound, but may even result from its absorption through unabraded delicate membranes, such as the mucous membrane of the stomach. The remote action of the poison of the cobra and other colubrine snakes seems usually to be mainly exerted on the nervous system. On the other hand, marked symptoms of blood-poisoning, preceded or accompanied by nervous symptoms, great or slight in

severity, are a usual result of the bite of the daboia and echis, and probably of other viperine snakes.

Action of snake-poison on nervous system.

782. An interval varying in duration usually elapses between the bite of a poisonous snake and the first appearance of nervous symptoms. In the human subject, according to WALL, this interval in cases of cobra bite is usually about an hour but may be longer; it is often longer in cases of bite by the less venomous snakes. In cobra bite, in the human subject, the chief nervous symptoms are a feeling of intoxication, followed by a loss of power in the legs, the patient staggering or falling if he attempts to walk or stand. The loss of power then spreads to other muscles, those of the tongue and larynx becoming early affected, and the powers of speech and deglutition are lost. About the same time profuse salivation sets in, the saliva trickling away, the power of expelling it having ceased. The paralysis then becomes general, the respiration slow, and consciousness may be lost; ultimately death occurs by asphyxia, due to gradual stoppage of respiratory movements. Nausea and vomiting are often early symptoms, and asphyxial convulsions may precede death. The pupil, as a rule, is but little affected. Very similar nervous symptoms usually follow the bite of other colubrine snakes. Daboia bite also causes marked nervous symptoms, but the paralysis is more general, does not specially affect the tongue and larynx, and salivation is, as a rule, absent; convulsions also are often present early in the case, and the pupil is usually dilated. In echis bite, the nervous symptoms are, as a rule, comparatively slight in severity. Mental shock, it may be further remarked, may to some extent modify the nervous symptoms present in a case of snake-bite; and from recorded cases it appears that the bite of a non-poisonous snake may give rise to mental shock so severe as to cause death.

Action of snake-poison on blood.

783. Symptoms of blood-poisoning may accompany or follow the nervous symptoms, and appear to be due to

the assumption by the blood of a condition of abnormal fluidity, resulting in an excessive tendency to hæmorrhage. Hence discharges of blood take place from the mucous surfaces, from the bitten part, abrasions on the skin, etc., and petechiæ may appear from effusion of blood into the subcutaneous cellular tissue. The action of the poison on the blood may modify also the local action of the poison, increasing the severity of the inflammation and causing sloughing of the wounded part or even gangrene of a limb. Severe symptoms of blood-poisoning are not usually present in colubrine snake-bite but are a marked feature of daboia and echis bite. They may continue for days after the nervous symptoms have disappeared, may end in death from exhaustion, and, in echis poisoning, are often the chief symptoms present. Further, owing to this special tendency to blood-poisoning, danger to life in cases of daboia and echis bite may continue long after the nervous symptoms have been recovered from; while, in colubrine snake-poisoning, danger, as a rule, ceases with the disappearance of the nervous symptoms. To this rule, however, must be excepted the poison of the *Bungarus fasciatus*. WALL, in experimenting upon animals with the poison of this snake, found that in some cases symptoms were caused by it exactly resembling those seen in cobra-bite, while in others the first effects of the poison in the nervous system were slight, and soon passed off, but, after an interval of two to five days, were followed by a fresh set of constitutional symptoms. The animal became weak, purulent discharges took place from the eyes, nose, and rectum, the urine became albuminous, and death occurred from exhaustion several days after the bite. In these cases, however, there was no tendency to hœmorrhage.

Transmission of snake-poison.

784. FAYRER mentions a case where an infant died from snake-poisoning, the poison having been conveyed through the milk of the mother, who had been bitten and also died. According to the same author, the blood of animals, dead of snake-poisoning, if injected into other animals,

destroys life. The bodies of animals killed by snake-poison may, however, be eaten with impunity by man and animals.*

785. Send for a doctor at once, but in the meantime the following plan† should be carried out:—Apply a ligature a few inches above the pierce of the bite, and apply three or four more such ligatures above the first one, at intervals of a few inches. The part may now be sucked by the patient or by a by-stander. It must be remembered, however, that this is a dangerous thing to do, if there are any abrasions, ulcers, or wounds on the lips or mouth, and whenever it is done the operator should immediately afterwards rinse his mouth out with a solution of Condy's Fluid or a powerful disinfectant lotion. After this has been done, incise the wounds by cutting across the punctures with a sharp penknife or other instrument, and allow the wound to bleed freely, or preferably, excise the punctured and poisoned parts to a depth of a quarter of an inch at least. Now apply either a hot iron or live coal, or some pure nitric or carbolic acid, to the bottom of these wounds as quickly as possible. Next give the patient, if an adult, 15 drops of solution of ammonia or a tea-spoonful of sal volatile in a wineglassful of water. If he is much depressed and inclined to faint, give him an ounce of brandy or whiskey, well diluted. If the bite be on such a part that ligatures cannot be applied, the first thing to be done is to suck the wound thoroughly, pinch up the punctured places, and excise a circular piece as large as the thumb nail from around each puncture to the depth of a quarter of an inch and apply one of the cauterising agents abovementioned. Should no symptoms of poisoning come on, in half an hour remove the ligatures, or the part will mortify from the stoppage of the circulation. But if depression, faintness, nausea, and quick breathing come on, the ligature should

Treatment of snake-bite.

* LYON'S *Medical Jurisprudence for India*, 2nd ed.

† Abstracted from HEHIR'S *Rudiments of Sanitation*, 2nd ed., p. 249.

be kept on until the patient is recovering or until the ligatured part is cold and livid. Repeat the brandy or other stimulant at hand every quarter or half hour, according to the amount of depression, but do not intoxicate the patient. Apply a mustard plaster over the heart and to the calves of the legs.

Condy's Fluid renders snake-poison inert.

786. People travelling in the jungle should always take with them some Condy's Fluid or the crystals of permanganate of potash. It has been proved that this salt of potash renders the poison inert, and if it can be brought into contact with the poison in the bitten part with sufficient rapidity, it is said that no symptoms of poisoning will ensue. If, however, a blood vessel has been penetrated by the poison fang, the poison is carried thoughout the system almost at once, so that nothing can be of much avail.

Only method of treatment of snake-bite.

787. No method of treatment of the bites of really venomous snakes (we refer especially to those of the cobra and krait) has hitherto proved satisfactory. The plan above sketched is based on the experience of one of the greatest living authorities on the subject. If the bite be that of a harmless snake, under this treatment the patient speedily recovers; if it be that of a poisonous reptile, no other mode of treatment is so efficacious.

Cure for snake-bite.

788. We frequently hear of persons having discovered a cure for snake bites. Pay no attention to such assertions. If the advice given by quacks be followed to the exclusion of the plan of treatment we have recommended, the unfortunate patient will be deprived of the only chance he has of recovery.

Mechanical irritants.

789. Under the head of *Mechanical Irritants* may be classed all substances which are liable, when swallowed, to cause symptoms of irritant poisoning, solely in consequence of their mechanical action on the parts with which they

come in contact. Many definitions of the term "a poison" exclude such substances. As already pointed out, however, the question whether or no such substances may properly be called poisons is, for medico-legal purposes, in India, a matter of little importance. In this country in fact, when it is alleged that an individual has committed an offence by administering or attempting to administer one of these substances, *e.g.*, pounded glass, the questions which a medical expert has to consider are,—

(1) What has been the effect of the administration of the substance? and

(2) Is the substance one which it is "deleterious to the human body to swallow" and not, "Is the substance 'a poison'" or an "unwholesome thing"?

790. Substances which, when swallowed, may act as mechanical irritants are,—

(1) Hard, sharp, angular, or pointed solid matters, *e.g.*, pounded glass, pins, and needles.

(2) Substances which swell largely by inhibition of water, *e.g.*, sponge; and

(3) Liquids at a high temperature, *e.g.*, boiling water or melted lead.

791. Of mechanical irritants, the following require special notice:—

Pounded glass as a mechanical poison.

(*a*) *Pounded glass.*—This, in many parts of India, is popularly believed to be a very active poison, and has been used both in attempts at suicide attempts at homicide. The Bombay Analyser's record for the ten years ending 1884 show that during that period this substance was only detected in thirty-one cases of alleged attempted human poisoning. In twenty-three of these it was detected in bread, sweetmeat, or some other article of food; in

three more in vomited matters, two of these being cases of attempted suicide by females; in one case it was found after death in the contents of the stomach of a man; in another in some pills; and in the three remaining cases pounded glass, *per se*, was sent for identification. In nearly all these cases, the glass found was colored glass resembling fragments of bangles, and in two only was it reported that the individuals suspected of having used the glass with criminal intent, were males. HARVEY again mentions five cases, all from the Central Provinces, of alleged attempted homicide by pounded glass, all being alleged attempts by wives to poison their husbands; and CHEVERS mentions a case brought to the notice of the Chemical Examiner, Bengal, in which a servant attempted to poison his master by pounded glass introduced into a mess of spinach; and also a Bombay case, in which a man seized in the act of committing a robbery attempted suicide by swallowing fragments of a wine bottle. The more finely glass is pounded, the more likely are the particles to become completely enveloped in mucous, etc., and to be thus prevented from injuring the mucous membranes. Hence, as the ill consequences arising from swallowing pounded glass are solely due to the mechanical injury it inflicts, the more finely it is pounded the less likely is swallowing it to cause harm. Considerable quantities of pounded glass, in large angular fragments even, have been swallowed without ill effects being produced. On the other hand, cases are recorded where swallowing pounded glass, has caused symptoms of irritant poisoning, and there is reason to suppose that in exceptional cases, swallowing pounded glass may even cause death. The treatment should consist in the administration, first, of bulky food, such as bread, potatoes and rice, so as to envelope the fragments, and then of emetics and laxatives.

Diamond dust as a mechanical poison.

(*b*) *Diamond dust.*—Diamonds and diamond dust are popularly believed in India to be very poisonous. Thus, in the Baroda case a mixture of arsenious oxide and diamond

dust was employed, and CHEVERS mentions two Indian cases of attempted suicide by swallowing an unbroken diamond. Like pounded glass, any injurious action possessed by diamonds or diamond dust is solely mechanical.

Chopped hair as a mechanical poison.

(c) *Chopped hair*—May act as a mechanical irritant. CHEVERS mentions that a belief exists in some parts of India that "tiger's smellers" are poisonous, and states on the authority of Baboo KANNY LALL DEY Rai Bahadur that chopped hair is sometimes used by cattle poisoners.*

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* LYON'S *Medical Jurisprudence for India*, 2nd *ed.*, pp. 229-230.

CHAPTER VIII.

CHEMICO-LEGAL EXAMINATIONS.*

THE following instructions are divided into two sections, *viz.*,—

SECTION I.—Containing rules for the guidance of magisterial and police officers.

SECTION II.—Containing rules for the guidance of medical officers.

Neither section is complete by itself, the two sections being complementary to one another.

SECTION I.—INSTRUCTIONS FOR GUIDANCE OF MAGISTERIAL AND POLICE OFFICERS.

1. The following instructions are issued for the guidance of magistrates, superintendents, and assistant superintendents of police with regard to the transmission of subtances to the chemical examiner for examination, in cases of suspected poisoning, or other cases in which the aid of the chemical examiner may be required:—

2. In future, substances will not be forwarded by medical officers to the chemical examiner, except upon receipt of an order to that effect from a magistrate, superintendent, or assistant superintendent of police. It will, therefore, be necessary that orders for the transmission of substances to the chemical examiner for analysis should be issued with promptitude. And an order should invariably be granted, if the medical officer consider it advisable to obtain the opinion of the chemical examiner; whilst, on the other hand, magistrates, superintendents, and assistant superintendents of police should issue an order for examin-

* (From G. O., 30th May 1883, No. 1062.)

ation, if they consider it desirable to consult the chemical examiner, although the opinion of the medical officer be adverse to such a proceeding.

3. Magistrates, superintendents, and assistant superintendents of police, on instructing medical officers to forward articles for analysis to the chemical examiner to Government, should, at the same time, address the latter officer, quoting the number and date of their order to the medical officer, and should furnish the chemical examiner with a brief summary of the history of the case.

4. The principal points on which magistrates, superintendents, and assistant superintendents of police, in cases of suspected poisoning, should furnish information to the chemical examiner, are as follow :—

(*a*) What interval was there between the last eating or drinking, and the first appearance of symptoms of poisoning?

(*b*) What interval was there between the last eating or drinking and death (if this occurred)?

(*c*) What were the first symptoms?

(*d*) Were any of the following symptoms present? If so, state which :—

(*a*) Vomiting and purging;

(*b*) Deep sleep;

(*c*) Tingling of the skin and throat;

(*d*) Convulsions or twitchings of the muscles;

(*e*) Delirium and clutching at imaginary objects;

(*f*) Were any other symptoms noticed?

(*g*) Did any other persons partake of the suspected food or drink, and did they also suffer from similar or other symptoms of poisoning?

5. Any other information available, likely to prove

serviceable as a guide to the class of poison administered, should at the same time be furnished.

6. Certificates of chemical analysis are not to be accepted from medical officers, as these officers are not in a position to conduct analyses as they should be carried out for judicial purposes. But any medical officer, who may be provided with a suitable microscope, should be able to recognise *recent* blood stains, and to conduct examinations of suspected seminal stains.

7. In every case of suspected human or cattle-poisoning, it is desirable, that all the substances requiring analysis should be packed and forwarded to the chemical examiner, by the nearest medical officer. If special circumstances should render it desirable to forward any articles directly to the chemical examiner, the instructions given in Section II, paras. 4—12, must be carefully attended to.

8. *Suspected Blood Stains.*—Articles requiring examination, for the presence of blood stains, may, if desirable, (*vide* para. 6), be forwarded direct to the chemical examiner, the following rules being strictly attended to:—

(1) When clothes are sent up, any stains considered to be suspicious, should be indicated by means of pencil marks or pins. Stains on walls, floors, the ground, or articles of furniture, etc., are not to be scraped off. But the stained area is to be carefully cut out; and when the material is brittle, as in the case of earth or chunam, it should be carefully wrapped in cotton wool and packed in a box, so that the surface may be preserved from injury.

(2) All articles requiring examination should be carefully labelled, and each label should bear the signature of the forwarding officer and the number and date of the letter of advice ad-

dressed to the chemical examiner. All parcels should be carefully sealed by the despatching officer and packed in such a manner that they cannot be opened without destroying the seal. The seal used should be the same throughout, and a private seal, or an official seal, which is kept in safe custody. A letter of advice should be separately forwarded to the chemical examiner. This letter should contain :

(*a*) An impression of the seal used in closing the packets and description thereof.

(*b*) A list of the articles forwarded, and a statement as to how the articles have been forwarded.

(*c*) Information as to whether any of the weapons, clothes, etc., are to be returned after examination.

9. *Miscellaneous Examinations.*—Magistrates, on forwarding coins, documents, salines, liquors, etc., to the chemical examiner, should follow the instructions laid down in para. 8, clause 2, and in Section II, para. 11, so far as they may be applicable ; and should be careful to include in their letter of advice to the chemical examiner, information as to the nature and object of the examination required, and to furnish any other information likely to assist the chemical examiner in making the required examination.

10. *Analysis of Water.*—*Vide* Section II, para. 15.

SECTION II.—INSTRUCTIONS FOR THE GUIDANCE OF MEDICAL OFFICERS.

Medical officers in charge of hospitals and dispensaries, are required to maintain a supply of methylated spirit and suitable bottles, etc., in readiness for the transmission of viscera and other matters to the chemical examiner, when occasion may arise. In cases of suspected poisoning it is exceedingly important that viscera and

other suspected matters, liable to rapid decomposition, should be placed in spirit as soon as practicable. And every care should be taken lest doubt may be raised in court as to the identity of articles likely to require examination, or as to the possibility of their having been accidentally contaminated or improperly interfered with.

2. *Post-mortem* examinations are to be made as thoroughly as circumstances will permit, whenever desired by magisterial or police officers. Attendance upon midwifery cases, or other similar excuses, will not exempt medical officers from the performance of the too frequently unpleasant, though most important, duty of making a *post-mortem* examination. Advanced decomposition does not prevent the detection of metallic poisons in the body. Hence remains of viscera may be forwarded for examination, when the condition of the body is such as to render any attempt at dissection useless.

3. On making a *post-mortem* examination, whenever there is any suspicion of poisoning, the stomach should be tied at both ends (a double ligature being applied at the pyloric extremity, so that the contents of the intestines may not escape), and removed from the body in such a manner that its contents may be retained; after removal it should be opened, the contents received into a perfectly clean bottle, and the mucous surface of the stomach carefully examined, its appearance noted, and any suspicious particles found adherent thereto, should be picked off with a pair of forceps, and placed in a separate small phial for transmission. And the mucous membrane of the mouth, *pharynx** and œsophagus should be examined, and any unusual appearance or marks of corrosion thereon carefully noted.

4. In all cases of death from presumed poisoning, the following articles should be forwarded for analysis, each in

* The *pharynx* is the musculo-membranous sac or cavity situated behind the mouth, nose, and larynx.

a separate bottle, unless otherwise indicated. It will, however, be understood that other matters should be forwarded if, in the opinion of the medical officer, the special circumstances of any case render such a proceeding advisable :—

(A) Stomach.

(B) Contents of the stomach which may, if it be convenient, be put in the same bottle with the stomach.

(C) Suspicious particles (if any have been found) removed from the mucous membrane of the stomach.

(D) A portion of the liver not less than 16 oz. in weight, or the whole liver, if it weigh less than 16 oz., and one kidney.

(E) The vomited matter, if any. The earlier and the later vomits should, when practicable, be sent up in different bottles; and the labels should state at what period the matters were emitted. Special directions are given in para. 6 for the disposal of vomited matters mixed with earth, etc.

(F) A specimen of the spirit used. Four ounces is sufficient.

When it is suspected that a vegetable poison has been used, the following matters should also be forwarded :—

(G) The contents of the small intestines.

(H) Any urine which may have been separately collected after the commencement of symptoms, or found in the bladder after death.

5. Strong methylated spirit should in all cases be added, as laid down in the rules for the transmission of articles for analysis, detailed in para. 11, to the contents of bottles *A*, *D*, *G*, *H*, and also to the contents of bottles *B* and *E*, unless it be suspected that alcoholic-poisoning has

been the cause of death. No spirit need be added to the contents of bottle *C*. Care should be taken that no vessel containing fluid matters is quite filled.

6. Vomited and purged matters are frequently received by medical officers mixed with earth, etc. If the admixture of earth be sufficient to render the evacuated matters dry and inoffensive, they may be packed without spirit in any convenient manner, otherwise they must be packed with spirit. Vomited and purged matters, if they have, as frequently happens, been allowed to fall on the ground, should be carefully scraped up, not taking more earth than is necessary. The superficial scrapings should be packed separately. It is rarely necessary to remove the earth to a depth greater than half an inch, even in cases of suspected metallic poisoning, unless the soil be of a very loose character. Except when a metallic poison is suspected, it is very rarely necessary to forward purged matters.

7. If articles of food, medicine, etc., suspected to have been the vehicle by which poison has been administered, require examination, they should each be packed up separately and spirit invariably added, as in the case of viscera, to such as are liable to decomposition. Fruits, such as the plantain and custard-apple, if suspected to contain poison, should be carefully inspected, and if it should appear that some foreign substance has been inserted, this should be picked out and sent up for examination. If no suspicious substance can be discovered, the fruit should be forwarded.

8. After having made a *post-mortem* examination in a case of suspected poisoning, and having preserved in spirit all articles liable to rapid decomposition, which are likely to require examination, the medical officer should report the result of his examination to the police, and on receipt of an order from a magistrate, or from a superintendent or assistant superintendent of police, but not before, forward the viscera of the deceased, and such other articles as may

require analysis, to the chemical examiner to Government, for examination. In cases where no death has occurred, but where it is suspected that poison has been administered, the medical officer, having preserved in spirit all articles liable to rapid decomposition, which are likely to require examination, should similarly report the case to the police, and on receipt of an order from a magistrate, superintendent or assistant superintendent of police, forward the vomited matter or contents of the stomach removed by the stomach-pump, of the affected individual, or other matters requiring analysis, to the chemical examiner to Government. Though magistrates, superintendents and assistant superintendents of police, are required to grant an order for analysis, should the medical officer consider such an examination necessary, they can, if they consider it advisable, order viscera, etc., to be sent to the chemical examiner, when, in the opinion of the medical officer, such a proceeding may be quite unnecessary.

9. When, on receipt of the necessary order, a medical officer forwards articles to the chemical examiner for examination, he should address at the same time a letter to the chemical examiner, advising him of their despatch. This letter should contain—

(*a*) An impression of the seal used in closing the bottles, and a description thereof.

(*b*) A list of the articles forwarded, and a statement as to how the articles have been forwarded.

(*c*) The name of the officer from whom the order has been received to forward the articles, and the number and date of such order.

(*d*) A detailed account of the *post-mortem* appearances observed.

(*e*) If he has seen the case during life, an account of the symptoms observed, and a statement of the treatment, if any, adopted.

10. All bottles and packets should be carefully sealed by the medical officer, and closed in such a manner that they cannot be opened without destroying the seal. The seal used should be the same throughout, and a private seal, or an official seal, which is always in safe keeping. Each bottle or packet should be labelled, and each label should bear the number and date of the letter of advice to the chemical examiner relative to the case, as well as a short description of the contents, and should be signed by the medical officer.

11. *Rules for the transmission of substances for Analysis.*—Suspected substances may be forwarded by post, carriage bearing, by passenger train, or steamer, or in charge of a constable. The latter method is recommended in all cases in which wealthy or influential parties are implicated. Officers forwarding viscera, etc., by post, by rail, or steamer, or by constable to the chemical examiner, will be held personally responsible that the following instructions are carefully followed :—

Transmission by post.—When viscera, etc., are forwarded through the post, the following rules are to be observed :—

(1) The suspected viscus, or other portion of the body, or other substance liable to decomposition requiring to be sent for examination, should be enclosed in a glass bottle or well glazed earthenware jar, provided with a well fitting stopper or sound cork.

(2) If liable to decomposition, it should be immersed in methylated spirits of wine, which should be used in the proportion of one-third of the bulk of the material, and care should be taken that no vessel containing liquid matters is quite filled.

N.B.—The use of spirits of wine in packing viscera

should be invariable, whether the season is hot or cold, and care should be taken that common bazaar spirit is not used.

(3) The stopper or cork should be carefully tied down with bladder, and large corks should be coated over externally with wax, glue, or tar. To ascertain that it has been securely closed, the bottle or jar should be placed for five minutes with its mouth down.

(4) The glass bottle or jar should then be placed in a strong wooden or extra strong tin box, which should be large enough to allow of a layer of raw cotton, at least one inch thick, being put between the bottle or jar, and the box.

(5) The box itself should be encased in common garah cloth, which should be sealed in accordance with the usual rules of the post office as to parcels.

(6) When articles are forwarded by post to the chemical examiner to Government, each package should be franked externally with the name and address of the officer forwarding the articles, and a declaration of contents to the officials of the postal department is unnecessary, and should not be made.

(7) At all stations where there is a district civil surgeon, the parcels should, when practicable, be sent to the post office by that officer, and not by a subordinate officer, but where there is no civil surgeon, substances may be packed and forwarded direct to the chemical examiner, by the subordinate officer in charge of the hospital or dispensary.

Transmission by rail or steamer.—When viscera, etc., are forwarded by rail or steamer, it is unnecessary to encase the box in cloth, but with this exception the rules

for forwarding articles through the post must be observed in forwarding articles by passenger train or steamer.

Transmission by constable.—When viscera, etc., are forwarded in charge of a constable, it will not be necessary to pack the bottles, etc., in a strong box, in order to protect them from rough handling during transit. But it is desirable that glass bottles containing viscera, etc., should be wrapped in cloth or paper, so as not to be offensive to other passengers.

In every other respect the same rules should be observed as in the transmission of viscera, etc., by rail.

12. *Suspected Blood Stains.*—Medical officers are in many instances expected to deal with these cases themselves.—*Vide* Section I, paras. 6 and 8.

13. *Suspected Seminal Stains.*—*Vide* Section I, para. 6. As the clothes requiring examination in these cases are usually exceedingly dirty, it is advisable, when practicable, to cut out any suspicious stains and forward them only for examination, instead of the whole garment. In cutting out stains, about half an inch of the surrounding cloth should be removed also. For information regarding packing and despatch of letter of advice, see instructions under head of Blood Stains.—*Vide* Section I, para 8.

14. *Cattle Cases :—*

(1) Some precaution should be taken to ensure that viscera, etc., are not sent for examination in cases where death obviously occurred from causes other than poison. A careful search should be made for any indications of the presence of a sui, when this mode of poisoning is suspected, and if anything resembling a sui be found, it should be forwarded for examination. A chemical examination of the viscera is useless in cases of sui-poisoning, as in such cases poison cannot be detected in the viscera.

(2) The entire alimentary canal should be opened, and its contents inspected for suspicious-looking substances. If any suspicious-looking substance be detected in the alimentary canal, it should be packed in a separate vessel, and spirit should not be added unless necessary for its preservation.

(3) About two pounds of the contents of the stomach, with about a pound of the contents of the intestines, should be placed in a clean glass or well glazed earthen vessel or vessels, and strong methylated spirit added in the proportion of not less than one-fourth of the apparent bulk of the material, when the contents are nearly dry, but if much liquid be present, spirit should be added in the proportion of one-third of the bulk of the material. Also about a pound of the liver, and a similar weight of the stomach, should be placed in a separate clean glass or well glazed earthen vessel, and methylated spirit should be added in the proportion of one-third of the bulk of the material. A sample of the spirit used in packing should also be sent. Four ounces are sufficient.

(4) Dried cattle dung may be sent without addition of spirit.

(5) Suspected cattle poisons rarely require the addition of spirit for their preservation, and spirit should not be used unless necessary.

(6) The instructions given us to the packing and transmission to the chemical examiner of substances requiring chemical examination, in cases of suspected human poisoning, are applicable to these cases, and should be carefully attended to, and the same precautions must be adopted as to

sealing and labelling the different vessels.—*Vide* paras. 9, 10 and 11.

(7) When under instructions received from a magistrate or superintendent or assistant superintendent of police a medical officer forwards articles to the chemical examiner for examination, he should at the same time address and forward separately a letter to the chemical examiner, advising their despatch. This letter should contain :—

(*a*) An impression of the seal used in closing the vessels, and a description thereof.

(*b*) A list of the articles forwarded, and information as to how the articles have been forwarded.

(*c*) The name of the officer from whom the order has been received to forward the articles, and the number and date of such order.

(*d*) Information as to the number and kind of animals affected, and number of deaths.

(*e*) Any information obtainable as to *post-mortem* appearances, nature and duration of symptoms, and which may be likely to indicate the probable nature of the poison.

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INDEX.

A.

	PARA.	PAGE.
Abdomen. Death from blow on— (Ill. Case XLVI & XLVII)		151
death from incised wound in— (Ill. Case XLV)	...	151
injuries to—	212	140
injuries to—causing peritonitis. (Ill. Case XLIV)	...	151
Abdominal cavity. Blood in—in liver cases	202	136
Abnormal causes of smothering	311	222
Aborters, professional	412	300
Abortion. Blood in—	418	302
difference in law regarding—	414	300
duties of medical officers in cases of—	391	284
examination of woman during life in case of—	399	290
Legitimacy, and Pregnancy. Chapter III on—	...	284
methods of causing—and drugs used	406	295
natural and criminal	368	268
of infants	...	294
signs of—in the living	401	291
signs of poisoning in—	392	287
suspicion of death from—	409	298
symptoms to be observed before ordinary signs of—	400	291
and Exposure of Infants. Chapter IV on—	...	294
Abortive drugs. Medical man applied to for—	415	301
responsibility for giving—	413	300
Abstinence in insurance	496	335
Abstract of cases of death by drowning	246	165
Acid. (carbolic). Case of—poisoning	699	441
fatal dose	698	440
poisoning	696	438
symptoms of—poisoning	697	440
treatment and antidote in—poisoning	700	441
(hydrochloric) poisoning	683	435
(mineral) poisoning by—	117	91
(nitric) poisoning	684	435
(prussic) Case of—poisoning	702	442
fatal dose of	703	443
poisoning	701	441
post-mortem appearances in—poisoning	705	443
Treatment and antidotes for—poisoning	704	443

	PARA.	PAGE.
Acid (sulphuric), fatal dose	680	433
poisoning	...	433
symptoms of—poisoning	681	434
treatment in—poisoning	682	434
(volatile)	689	436
and Alkalies. Chapter on—	...	433
Accidental cases of death in insurance	497	336
deaths and suicides	251	172
due to unrestricted sale of poisons	659	422
in Madras. Statistics of—	(Table)	183
statistics of suicides, &c.	258	175
strangulation with navel-string (Ill. Cases LXXX & LXXXI)	...	282
suffocation. (Ill. Case LX)	...	223
Accidents. Reasons assigned for—	171	129
Accused. Failure to call medical aid does not exonerate—	80	58
held liable for death following operation based on mistaken diagnosis (Ill. Case XI)	...	65
unsoundness of mind as regards—	583	370
Aconite as a poison	746	468
general remarks on—	714	450
medicinal use of—	712	450
poisoning (Ill. Case LXXXVI)	...	475
difficulty of detecting—	708	447
shrub	709	448
statistics of—	710	448
	715	451
	707	446
symptoms of—	711	449
treatment and antidotes for—	713	450
Acute dementia	551	359
Addition to life	478	327
Administration report. Extracts from Madras—	623	396
Adults. Traces of injury on—	331	246
Adverse influences in life insurance	479	327
Affiliation cases	402	292
Age. Statements regarding—unreliable	353	255
when European girls attain puberty in India	346	252
when Native girls attain puberty	345	252
Aggressor's responsibility for injury	76	56
Aid. Failure to call medical—	80	58
Air, earth, and water. Decomposition in—	130	99
Albumen as affecting life risk	465	322
Albuminuria. Persistent—	466	322
Alcohol. Insanity due to—	568	366

	PARA.	PAGE.
Alcoholic insanity	564	364
symptoms of—	565	365
poisoning	694	438
Alkalies and Acids. Chapter on—	...	433
Alkaloidal (non-) irritants	619	392
Alleged rape at age 47. (Ill. Case LXXI)	...	258
Ammonia poisoning	685	435
antidote in—	687	436
symptoms of—	686	436
Amphibia	760	481
Analysis of cases of rupture of intestines	209-11	139-40
of phthisical patients	476	326
Animal heat. Method of restoring—	268	184
Animals. Comparative experiments on—	617	391
(diseased). Flesh of—	770	485
experiments on—with suspected substances	616	390
Poisons. Chapter on—	...	481
Anger, grief, and shame	319 (2)	229
Animation. Suspended—	372	271
Antidotes for aconite poisoning	713	450
for ammonia poisoning	688	436
for antimonial poisoning	664	425
for arsenic poisoning	653	419
for camphor poisoning	693	438
for carbolic acid poisoning	700	441
for mercurial poisoning	670	429
for opium poisoning	755	472
for prussic acid poisoning	704	443
Antimonial poisoning. Antidotes for—	664	425
English cases of—	666	426
symptoms of acute—	662	424
of chronic—	663	425
Antimony	...	424
and other Metallic Poisons. Chapter III on—	...	424
medicinal uses of—	665	426
Anus of sodomite. Appearance of—	438	310
Apnœa or asphyxia	27	22
(asphyxia) death beginning at the lungs	29	24
Apoplexy or asphyxia	274	194
Appearance of wounds inflicted after death	57	42
inflicted during life	56	41
Appearances. Special—noted in mutilated remains	...	35
Arrack (country) contains copper	677	432
Arsenic. Amount of—found in liver	646	414

	PARA.	PAGE.
Arsenic an indestructible poison	650	417
antidote for—	653	419
attempts at poisoning by—	629	406
Chapter on Poisonous Irritants, and—	...	402
common forms of—	631	408
criminal poisoning by—	635	409
eaters	637	409
externally applied or inhaled	639	410
legitimate use of—	634	409
poison. Trials for—	651	418
poisoning. Anomalous occurrences in—	642	412
by—in acute form	641	411
by—in chronic form	643	412
deaths from—recorded as cholera	648	417
errors regarding—	613	389
false charge of—	647	415
Madras. Statistics of—	661	423
recoveries from—	645	414
similarity of to cholera	644	413
statistics of cases of—	628	406
symptoms of—	636	409
treatment in—	652	418
various forms of—distinguished by color	632	408
used for art purposes	638	410
(white)	640	411
(white). Case of Kimidi Maharani poisoned with	630	407
(white) and arsenicum	633	408
Arsenicum and white arsenic	633	408
Article in *Madras Times*. Mr. Gribble's—	259-61	175-79
Artificial inducement of premature labour	425	305
respiration. Howard's method of—	270	184
Marshall Hall's method of—	272	185
methods of—	269	184
Sylvester's method of—	271	185
Assault. Effects of unauthorised—	81	58
Asphyxia	237	159
and Suffocation. Chapter III on—	...	218
(apnœa), death beginning at the lungs	29	24
or apnœa	27	22
or apoplexy	274	194
percentage of—in drowning	252	173
Assault. Rice-pounder weapon of—	68	46
Asylums. Law on commitment of insanes to lunatic—	601	379
(lunatic), sudden death in—	145	113

	PARA.		PAGE.
Atropine. Chronic poisoning by—	734		462
description of—	728		459
English statistics of death from—	730		459
Fatal dose of—	732		460
morphine an antidote to— (Ill. Case XCVII)	...		479
poisoning. Treatment in—	735		462
and datura poisoning. Statistics of—	737		463

B.

	PARA.		PAGE.
Bamboo or lathi commonly used in Bengal	70		48
Bansdola. Torture by—	139		110
Bees, wasps, and hornets	763		482
Bengal. Statistics of poisoning in—	...		401
Bestiality. Definition of—	442		313
examination in cases of—	444		314
and Sodomy. Chapter V on—	...		308
Bhang. Murder under influence of—	742		466
Birth. Case of how long child lived after—	398		290
of child. Evidence as to—	371		270
summary of facts regarding live—	382		276
Bite (snake). Cure for—	788		496
Bladder and gall bladder. Wounds to—fatal	214		141
Blood. Examination of linen for—	335		247
extravasated in liver cases	203		136
hæmin crystals how produced in—	102		77
in abdominal cavity in liver cases	202		136
in abortion	418		302
marks of—	100		74
marks of—not necessarily found on clothes of murderer	105		78
menstrual—	104		78
spectroscopic appearances of—	103		78
Bloodstains. Action of caustic potash on—	101	(5)	77
action of guaiacum on—	101	(7)	77
of heat on—	101	(4)	76
of nitric acid on—	101	(6)	77
of water on—	101	(3)	76
and spermatozoa	337		248
characters of—	101		76
microscopic demonstration of—	101	(2)	76
ocular inspection of—	101	(1)	76
Blow. Cerebral hæmorrhage from— (Ill. Case XXXVII)	...		118
difference between—caused before or after death	53		41
on abdomen. Death from— (Ill. Cases XLVI & XLVII)	...		151

	PARA.	PAGE.
Blows or falls on the head	577	368
rule regarding—given after *rigor mortis*	55	41
Bodies. Buoyancy of decomposed—in water	131	100
circumstances to be noted at time of finding—	99	73
condition of drowned—	249	170
cord should be examined in cases of hanged—	289	203
fat—putrefy sooner than thin	123	92
found in same house as murderer. (Ill. Case XXXIV)	...	105
how long—has been dead	...	84
identification of—	39	30
inspection of—in hanging and strangulation	302	212
marks found on dead—	4	5
mutilation of—after death. (Ill. Case VI)	...	51
notes of appearances at first examination of—	281	199
notes regarding buoyancy of dead—	132	101
of drowned. *Post-mortem* appearances of—	250	170
period in which—cool	107	85
points to be noted when—is found	13	11
points to be noted when hanged—first discovered	279	196
post-mortem examination of decomposed—	11	10
temperature of human—	322	234
warm or cold when found	12	10
warmth of—important evidence	290	203
Bombay. Statistics of poisoning in—	...	400
Bones. Fractured—as complications in liver	198	135
notes in regard to skeleton or individual—	40 III	35
Born alive. Hydrostatic test as to whether child—	369	269
Bowels. Intussusception of—	627	406
rupture of—	205	136
caused by severe contusion	206	136
Brain after death by drowning	245	165
concussion. Difference between—and intoxication	134	106
damaged by injuries to face. (Ill. Case XXXVIII)	...	118
effusion on the— (Ill. Case XXXVI)	...	117
Bruises or contused wounds	52	40
Buoyancy of dead bodies. Notes regarding—	132	101
of decomposed body in water	131	100
Burying alive	313	227
of lepers	314	227
of widow with deceased husband	316	228

	PARA.	PAGE.
C.		
Cadaveric rigidity	109	86
commencement of—	111	86
duration of—	110	86
spasm. (Ill. Case XXVII)	...	83
Camphor poisoning	690	437
bodies smell strongly of substance	692	438
symptoms of—	691	437
treatment and antidotes for—	693	438
Cancer	471	323
Capacity. Test of—of insane to make a will	597	377
Testamentary—of insane	596	377
Cannabis Indica. Appellations for—	738	464
effects of—	739	464
poisoning. (Ill. Case XCII to XCVI)	...	477,478
(tincture of). Symptoms of—on delicate women	744	466
used as an intoxicant	745	467
Cantharides	773	486
Carbolic acid. Fatal dose of—	698	440
poisoning	696	438
case of—	699	441
symptoms of—	697	440
treatment and antidote in—	700	441
Cases. False evidence in true—	19	17
in which death results from neglect of slight wound	79	58
quoted of unskilful treatment	78	57
remarkable—of identification	42	37
Caste and position of child's parents	336	247
Cattle-poisoning	657	420
statistics of—	658	421
Cause of death	37	30
doubtful. (Ill. Case III)	...	49
mistaken. (Ill. Case V.)	...	51
presumed. (Ill. Case IV)	...	50
real—different from apparent cause. (Ill. Case VIII)	...	53
sudden	30	25
Causing death in self-defence	71	48
Caustic potash	688	436
Caution before expressing opinion	7	8
necessary in deciding whether tetanus caused by wound	89	62
Centipedes and spiders	762	481
Cerebral hæmorrhage from blow. (Ill. Case XXXVII)	...	118
Cerebral hyperæmia with precipitate labour. (Ill. Case LXXXII)	...	282

	PARA.	PAGE.
Chapter on abortion and exposure of infants	...	294
legitimacy, and pregnancy	...	284
acids and alkalies	...	433
animal poisons	...	481
antimony and other metallic poisons	...	424
asphyxia and suffocation	...	218
chemico-legal examinations	...	500
circumstantial evidence	...	69
drowning	...	157
evidence in India	...	15
hanging and strangulation	...	193
infanticide and fœticide	...	264
insanity	...	338
insanity as affecting responsibility	...	369
life insurance	...	315
modes of death	...	22
poisonous irritants and arsenic	...	402
poisons	...	381
progress of decomposition and inference regarding time of death	...	84
rape	...	238
responsibility for death	...	55
rupture of internal organs	...	122
snake poisons	...	488
suffocation from gases, &c.	...	226
sun-stroke, lightning-stroke, and starvation	...	234
unnatural offences—sodomy and bestiality	...	308
vegetable poisons	...	445
wounds and injuries	...	29
wounds, ruptures, and other injuries	...	106
Changes produced by putrefaction	116	90
Chest. Incised wounds to—	138	109
pressure on—a means of extorting confessions	144	113
Chemico-legal examinations. Chapter on—	...	500
Chevers. Case of rupture of spleen recorded by—	219	143
Child born alive. Hydrostatic test as to whether—	369	269
case of midwife claiming maternity of—	421	303
evidence as to birth of—	371	270
poisoning	655	419
Children born before seventh month rarely live	362	266
(supposititious)	422	304
Chloral poisoning	695	438
Chloroform poisoning	695	438
Cholera	627	404

	PARA.	PAGE.
Cholera, death from arsenic poisoning recorded as—	648	417
English—	627	405
similarity of arsenic poisoning to—	644	413
Chopped hair as a mechanical poison	791	499
Chronic starvation	327	237
symptoms and signs of—	328	237
Circumstances which promote and retard putrefaction	124	93-97
to be noted at time of finding body	99	73
Circumstantial evidence. Chapter VI on—	...	69
Classification of mental disorders	530	351
varieties of insanity	530	351
Climacteric insanity	562	364
Clothes or ornaments may aid in establishing identity	41	36
Coin. Swallowing a— (Ill. Case LXXVIII)	...	224
Colic	627	406
Colubrine snakes	777	490
Coma	28	23
death beginning at head	29	23
Concealment by applicant for insurance	492	332
material	490	331
risk of	493	333
Concluding remarks	25	22
Concocted evidence. False and—	16	15
Concussion of brain. Difference between—and intoxication	134	106
Condy's Fluid renders snake-poison inert	786	496
Confessions. Extortion of—	143	112
false—(Ill. Case XLIII)	...	120
not uncommon	23	20
made to police inadmissible as evidence	141	111
obtained by police	140	111
pressure on chest a means of extorting—	144	113
Confinement (premature) by operation	416	301
Consumptives. Rules regarding lives of—	477	326
Contused wounds. Bruises or—	52	40
Contusion. Rupture of bowel caused by severe—	206	136
Copper. Country arrack contains—	677	432
poisoning. Symptoms of acute—	675	430
symptoms of chronic—	676	431
Cord should be examined in cases of hanged bodies	289	203
used by suicides	300	211
Corpulency	472	323
Corrosive and irritant poisons. Difference between—	626	403
Crime. Pregnancy not necessary in England to establish—	417	302
Criminal abortion. Natural and—	368	268

	PARA.	PAGE.
Criminal poisoning by arsenic	635	409
miscarriage	426	305
responsibility of insanes	584-85	370-71
Crystals. Hæmin—how produced	102	77
Cure for snake-bite	788	496
Cut-throat	235	150
patient dies of suffocation in case of—	84	59
recovery from— (Ill. Cases XLIX to LIII)	...	153-155
Cysticerci	771	485

D.

Datura. Remarks regarding—	736	463
poisoning. Statistics of—	729	459
Ill. Cases XCII to XCVI	...	477-79
in India	731	459
symptoms of—	733	460
and atropine poisoning. Statistics of—	737	463
Daturine. Description of—	728	459
Dead. How long body has been—	...	84
bodies. Marks found on—	4	5
Notes regarding buoyancy of—	132	101
Deaf and dumb treated as persons of unsound mind	591	374
Deaf-mutes as witnesses	595	376
Deaths. Accidental—and suicides	251	172
(accidental) due to unrestricted sale of poisons	659	422
after long periods	65	45
(Ill. Case IX)	...	53
arising from unskilful treatment of wound	77	56
before submersion	248	169
beginning at head (coma)	29	23
heart (syncope)	29	23
lungs (apnœa or asphyxia)	29	24
by blow on abdomen (Ill. Cases XLVI & XLVII)	...	151
by drowning. Abrasions and wounds on bodies after—	240	160
abstract of appearances of—	246	165
brain after—	245	165
heart after—	244	164
internal appearances after—	243	163
summary of proofs of—	247	168
by epilepsy. Marks on the throat in—	297	208
by hæmorrhage after rape	344	251
by hanging. Cause of—	...	193
external appearances in—	291	204
internal appearances in—	292	205

	PARA.	PAGE.
Deaths by heat	323	234
by lightning	312	227
by neglect. (Ill. Case LXXXIII)	...	283
by rape. *Post-mortem* after—	356	256
by rupture of internal organs	...	123
by shock	62	43
by squeezing of testicles	63	44
by strangulation.	294	206
by suffocation. *Post-mortem* appearances in—	305	219
by suicide. Statistics of *post-mortem* in—	299	210
by surgical operation	92	63
by surgical operation. (Ill. Case XVI)	...	67
by violence. Statistics of—	...	157
cases in which—results from neglect of slight wound	79	58
caused under false plea of private defence. (Ill. Case X)	...	54
caused without body being suspended	287	202
cause of—	37	30
Causes of sudden—	30	25
Causing—in self-defence	71	48
Chapter on modes of—	...	22
Chapter on responsibility for—	...	55
Distinguishing features of wounds inflicted before and after	46	38
doubtful. (Ill. Case III)	...	49
due indirectly to injury caused by person himself	85	59
due to what	377	273
during menstrual period	393	288
Evidence as to whether wounds inflicted before or after	44	38
following operation on mistaken diagnosis. (Ill. Case XI)	...	65
from arsenic poisoning recorded as	648	417
Homicide when—occurred as secondary cause of injury. (Ill. Case XII)	...	66
in cases of rupture of spleen	166	128
mistaken. (Ill. Case V)	...	51
Mode of— in drowning	253	174
Mutilation of bodies after. (Ill. Case VI)	...	51
of fœtus. Determination of causes of—	378-79	273-74
of wounded persons from natural causes	64	44
Opinion as to time of—from state of putrefaction	129	99
Period of— from decomposition. (Ill. Case XXXIII.)	...	104
presumed. (Ill. Case IV)	...	50
Presumption of—	31	62
Real cause of—different from apparent cause. (Ill. Case VIII)	...	53

	PARA.	PAGE.
Deaths. Recorded cases of—from slight injuries	75	56
resulting from rupture of spleen	178	131
Rules adopted in Europe regarding period of—	60	42
Secondary causes of—	83	59
Statistics of accidental—in Madras	(Table)	183
sudden—in lunatic asylums	145	113
suicides and accidental—	258	175
Suspicion thrown on enemies of deceased's family in cases of natural—	47	38
Tabular view of modes of—	29	23
Time between injury and—in liver cases	204	136
What was cause of—? (Ill. Case XLVIII).	...	152
where no internal or external mark of injury	61	42
without injuries	286	202
Wound or hurt which hastens death in person already diseased	82	58
Wounds caused after—	45	38
before or after—	10	9
Decomposed body. Buoyancy of—in water	131	100
Post-mortem examination of—	11	10
Decomposition	106	84
Arrest of—	656	420
Effect of generation of gas in— (Ill. Case XXXII)	...	104
Four stages of—	112	86
in air, earth, and water	130	99
Progress of— &c. Chapter VII on—	...	84
Defence. Death caused under false plea of private— (Ill. Case X)	...	54
Definition of bestiality	442	313
insanity	500	338
murder. Weapon used effects—	87	61
Defloration not sufficient proof of rape	333	246
Delirium in febrile state	540	356
tremens	91,538	62,355
Delusions	501	338
Dementia	545	357
acute	551	359
diagnosis of—	550	359
mind in—	546	358
patients	548	358
primary	547	358
progressive	566	365
Symptoms of—	549	358
Destruction of hymen	338	248
Details. General—to be observed regarding identity	40	31

	PARA.	PAGE.
Diabetes. Indication of—	469	323
Diagnosis of dementia	550	359
Death following operation on mistaken— (Ill. Case XI.) .	...	65
of feigned insanity	516	345
of insanity	508	341
Diamond dust as a mechanical poison . . .	791(*b*)	498
Difference between law in India and England . .	73,86	56,60
vital and *post-mortem* ecchymosis . .	115	89
Dipsomania	567	365
Direction of jury	587,88	371,72
Discharge from the ear	482	328
Discoloration. Period of—	122	92
Diseased animals. Flesh of—	770	485
liver as complication	199	13
Diseases requiring special remarks	470	323
whose symptoms resemble irritant poisoning .	627	404
Dislocation of neck and injuries to spine. (Ill. Case XLI) .	...	119
Dose, fatal	660	422
Dress	93	69
Drowned bodies. External appearances of— . .	241	161
Condition of—	249	170
Post-mortem appearances in—	250	170
Treatment of—	267	183
Drowning	238	159
abrasions and wounds in bodies after death from drowning.	240	160
Abstract of appearances of—	246	165
Brain after death by—	245	165
Cases of— (See Ill. Cases LV to LIX) . . .	...	186-192
Causes assigned for—	254	174
Chapter on—	...	157
External appearances in cases of—	239	160
Heart after death by—	244	164
Internal appearances after death by— . . .	243	163
Liquid blood in cases of—	242	163
Mode of death in—	253	174
Percentage of asphyxia in—	252	173
Summary of proofs of death by—	247	168
Drugs (abortive). Medical man applied to for— . .	415	301
Responsibility for giving—	413	300
used for causing abortion	406	295
Drunkenness	589	372
Dumb and deaf treated as persons of unsound mind .	591	374
Dust (diamond) as a mechanical poison . . .	791(*b*)	498

	PARA.	PAGE.
E.		
Ear. Discharge from the—	482	328
Earth. Decomposition in air,—, and water	130	99
Eccentricity. Difference between—and insanity	512	344
Ecchymosis. Difference between vital and *post-mortem*	115	89
Effect of generation of gas in decomposition. (Ill. Case XXXII)	...	104
of poisons	607	385
of sulphuric or oxalic acid or caustic alkalies. Melanosis mistaken for—	118	91
of unauthorised assault	81	58
Effusion on the brain. (Ill. Case XXXVI)	...	117
Eminent skill not expected. (Ill. Case XVIII)	...	67
Emission of semen and fæces	284	201
Enemies of deceased's family. Suspicion thrown on — in cases of what	47	38
England. Difference between law in India and—	73,86	56,60
English cholera	627	405
law presumes nothing	34	28
Enlargement of liver	487	330
spleen	488	330
Enteritis	627	405
Epilepsy	571	366
Marks on throat in death by—	297	208
Erysipelas	90	62
held not to be result of injury. (Ill. Case XIV)	...	66
result of ulcer not of wound. (Ill. Case XV)	...	66
Ether poisoning	695	438
European girls. Age when—attain puberty in India	346	252
Evidence. As to whether wounds caused before or after death	44	38
Burden of—	495	335
by proxy. Mahomedan law regarding—	18	17
(circumstantial). Chapter on—	...	69
Confessions made to police inadmissible as—	141	111
False and concocted—	16	15
how obtained	615	390
in India. Chapter on—	...	15
in regard to scars	8	8
in true case	19	17
of poisoning (general)	606	384
of uneducated class of natives	22	20
Ordinary occurrence in—of police officers	142	112
peculiarities of native—	17	16

	PARA.	PAGE.
Evidence result of ignorance	21	19
Subsequent—regarding wounds	43	37
through fear	20	18
Warmth of body important—	290	203
Examinations (chemico-legal). Chapter on—	...	500
for life insurance. Details of—	457	319
in cases of bestiality	444	314
in rape	330	238
medical	491	332
of decomposed body	11	10
of external wounds	9	9
of insuree	455	318
of linen for blood	335	247
of sodomy	441(*a*)	311
Post-mortem	49	39
Expectation of life reduced in India	481	328
Experiments (comparative) on animals	617	391
on animals with suspected substances	616	390
Exposure of infants	419	303
Chapter IV on Abortion and—	...	294
to heat. Effect on system of—	324	234
Expression of opinion on facts	6	6
Caution before—	7	8
External appearances in death by hanging	291	204
marks of violence	172	129
wounds. Examination of—	9	9
Extorting confessions. Pressure on chest a means of—	144	113
Extortion of confessions	143	112
Extracts from Madras Administration Report	623	396
Eyes. Gouging out— (Ill. Case LIV)	...	156

F.

	PARA.	PAGE.
Face. Brain damaged by injury to—(Ill. Case XXXVIII).	...	118
Wounds on—	136	108
Facts only should be recorded	6	6
Fæces. Emission of semen and—	284	201
Failure to call medical aid	80	58
Falls. Blows or—on the head	577	368
False and concocted evidence	16	15
False confessions. (Ill. Case XLIII)	...	120
evidence in true case	19	17
through fear	20	18
not uncommon	23	20
Family history of applicant for insurance	463	321

	PARA.	PAGE.
False result of ignorance	21	19
Fatality in cases of wounds and rupture of heart	217	142
Fear. False evidence through—	20	18
Febrile state. Delirium in—	540	356
Feigned insanity. Diagnosis of—	515	345
indications of—	516	345
Fish (globe)	767	484
(live). Suffocated by a—(See Ill. Case LXX)	...	225
poisoning. Varieties of—	768	484
(poisonous)	765	482
(shell)	766	483
swallowing a—(See Ill. Case LXIX)	...	225
Flesh of diseased animals	770	485
Flies. Period of appearance of—	126,127	98
Fœticide and Infanticide. Chapter II on—	...	264
Fœtus. Determination of cause of death of—	378,79	273-74
Death of—due to what	377	273
Post-mortem delivery of—	410	298
Whether—born dead or alive	383	277
Fracture. Difficulty in defining cause of—	222	145
of skull	135	107
(Ill. Case XXXIX)	...	118
of newly-born infants	381	275
Fractured bones as complication in liver	198	135
Fractures as affecting locomotion	224	146
Difficulties in regard to	67	46
during life and after death	223	145

G.

	PARA.	PAGE.
Gall bladder. Wounds to bladder and—generally prove fatal	214	141
Gangrene. Death from—	411	300
Ganjah smoking	740,41	465
Gas in decomposition. Effect of generation of—(Ill. Case XXXII)	...	104
See—Gases. Suffocation from inhalation of noxious—.	...	224
Gastritis	627	405
General details to be observed regarding identity	40	31
Genital organs of sodomites	437	310
Girls (European). Age when—attain puberty in India	346	252
(Native). Age when—attain puberty	345	252
Marriage of—	347	252
Glass (pounded) as a mechanical poison	791	497
Globe fish	767	484
Gouging out eyes. (Ill. Case LIV)	...	156
Gout	483	329
Gout or rheumatism	569	366

	PARA.	PAGE
Gribble's (Mr.) article in *Madras Times* . . .	259-261	175-179
Grief, shame, and anger	. 319 (2)	229
Gun-shot. Blank charge often causes wound like— .	. 233	150
from conical or round bullet . . .	. 227	147
injury	. 228	148
of entrance	. 226	147
premeditation in case of—	. 230	149
Presumption in case of—	. 232	149
wounds	225,229	146,148
Guy's objection to hydrostatic test . . .	. 370	270

H.

	PARA.	PAGE
Hæmin crystal how produced	. 102	77
Hæmorrhage after rape. Death from— . . .	. 344	251
as complication in liver	. 201	136
Cerebral—from blow (Ill. Case XXXVII) . .	.	118
Treatment of rupture of spleen in case of internal— .	. 156	125
Hair (chopped) as a mechanical poison . . .	. 791(*c*)	499
Hairs. Human spermatozoa and animal . . .	. 443	313
Hallucinations	. 502	339
Difference between—and illusions . . .	. 504	339
Hanged bodies. Cord should be examined in cases of— .	. 289	203
Death by—without body being suspended . .	. 287	202
External appearances in death by— . . .	. 291	204
(incomplete). Statistics of—	. 288	202
Inspection of—	. 302	212
Internal appearances in death by— . . .	. 292	205
Judicial—.	. 276	195
Mackenzie's statistics of—	. 275	194
Points to be noted when—first discovered . .	. 279	196
usually due to suicide—.	. 278	196
Hanging and Strangulation. Chapter II on . .	. ...	193
Head. Blows or falls on the—	. 577	368
Death beginning at—(coma)	. 29 I	23
wounds of—	. 133	106
Heart after death by drowning	. 244	164
Death beginning at—(syncope)	. 29 II	23
disease in insurance	. 484	329
Fatality in cases of wounds and rupture of . .	. 217	142
Rupture of	. 215	141
Signs of wound of	. 218	142
Wounds of	148,216	115,141
Heat (animal) method of restoring— . . .	. 268	184

	PARA.	PAGE.
Heat. Death from—	323	234
Effect on system of exposure to—	324	234
Results of excessive—	...	234
Hemp (Indian). See CANNABIS INDICA		
Hernia	627	406
Homicidal suffocation. Methods of—	307	220
(See Ill. Cases LXI to LXV)	...	223
Homicide by suffocation	306	220
Hornets, wasps, and bees	763	482
Howard's method of artificial respiration . . .	270	184
Human body. Temperature of—	322	234
life. Uncertainty of—	449	316
spermatozoa and animal hairs	443	313
Hurt. Wound or—in person already diseased . . .	82	58
Hydrochloric acid poisoning.	683	435
Hydrostatic test as to whether child born alive . . .	369	269
Guy's objection to—	370	270
Hymen. Destruction of—	338	248
Mechanical means used to destroy— (Ill. Case LXXVII). .	...	263
Hyperæmia (cerebral) with precipitate labour. (Ill. Case LXXXII)	...	282
Hypochondriasis	531	352
Hypostases	114	88
Marks round neck may be due to—	298	209
mistaken for marks of injury. (Ill. Cases XXIX to XXXI) .	...	103
occurs before putrefaction	115	88

I.

	PARA.	PAGE.
Identification (non-) of remains. (Illustrative Cases I & II .	...	49
of body	39	30
Remarkable cases of—	42	37
Identity. General details regarding—	40	31
Identity. Clothes or ornaments may aid in establishing— .	41	36
Idiocy.	527,552	350,359
Manifestations of—	553	359
Ignorance. False evidence result of—	21	19
Illusions.	503	339
Difference between—and hallucinations . . .	504	339
Illustrative Cases I to X	...	49-54
XI to XVIII	...	65-68
XIX to XXVII	...	80-83
XXIX to XXXIV	...	103-105
XXXV to XLIII	...	117-121

	PARA.	PAGE
Illustrative Cases XLIV to LIV	...	151-156
LV to LIX	...	186-192
LX to LXX	...	223-25
LXXI to LXXIX	...	258-63
LXXX to LXXXIII	...	282-83
LXXXIV to XCVII	...	474-80
Imbecility	555	360
Classes of—	556	361
moral	557	361
Incised wound in addomen. Recovery from— (Ill. Case XLV).	...	151
wounds to the chest	138	109
Increase of suicide. "*Lancet*" on	262	179
Indestructible poison. Arsenic an—	650	417
India. Chapter on Evidence in—	...	15
Difference between law in—and England	73,86	56,60
Indian Hemp. See CANNABIS INDICA.		
Indian law requires amendment	593	375
snakes	780	492
Indica (cannabis). Appellations of—	738	464
(cannabis). Effects of—	739	464
Individual bones. Notes regarding skeleton or—	40 III	35
Infant. Important changes after—has breathed	375	273
Lung test in case of strangulation of—	374	272
Infanticide	360	266
and fœticide. Chapter II on	...	264
case of—at Cuddapah	367	268
common in all countries	...	264
Decrease of—in recent years	388	280
Essential point to be proved in—	361	266
Law regarding proof of—	366	267
Resume regarding—	386	279
Special points regarding—	389	281
Taylor's summary of—	384	278
Two forms of—exist	359	264
Infants. Abortion of—	...	294
Chapter IV on Abortion and Exposure of Infants	...	294
Exposure of—	419	803
Fracture of skull of newly-born—	381	275
Taylor's summary regarding injuries to—	385	279
Inhalation of noxious gases. Suffocation from—	...	226
Injured person. Failure of—to call medical aid	80	58
Injuries caused by rape on virgin	342	251
Chapter IV on Wounds and—	...	29
Chapter VIII on Wounds, Ruptures, and other—	...	106

	PARA.	PAGE.
Injuries. Recorded cases of death from slight—	75	56
Rupture of internal organs result of violent	146	113
to abdomen	212	140
to abdomen causing peritonitis. (Ill. Case XLIV)	...	151
to infants. Taylor's summary regarding—	385	279
to spine	137	109
to spine and dislocation of neck (Ill. Case XLI)	...	119
Injury. Death where there is no internal or external mark of—	61	42
Gun-shot—	228	148
on adults. Traces of—	331	246
Responsibility of aggressor for consequences of—	76	56
Time between—and death in liver cases	204	136
Innocent man. Case of judicial murder of—	58	42
Insane. Conduct of—	522	348
Criminal responsibility of—	584-85	370-71
Difference between feigned and real—	518	347
Importance of previous history of—	517	346
Testamentary capacity of—	596	377
Test of capacity of—to make a will	597	377
Tuberculosis in—	529	351
Insanity, alcoholic	564	364
and unsound mind	582	369
as affecting civil rights and liberties	599	378
as affecting responsibility. Chapter III on—	...	369
as affecting witness	594	375
causes of—	523	349
Chapter II on—	...	338
Classification of varieties of—	530	351
climacteric—	562	364
definition of—	500,506	338,340
Diagnosis of—	507,508	341
of feigned—	515	345
Difference between—and eccentricity	512	344
Diseases in which—may appear	574	367
due to alcohol	568	366
errors regarding—	513	344
feigned by ignorant and common people	519	347
for various reasons	520	347
from sexual intercourse	528	351
from sunstroke	573	367
(incipient) associations of—	511	343
Indications of feigned—	516	345
Means to be adopted in detecting—	521	348
Moral causes of—	524	349

	PARA.	PAGE.
Insanity of pubescence—	561	363
Physical causes of—	525	349
Prognosis of—	526	350
senile	563	364
Symptoms of—	509-10	341-43
Symptoms of alcoholic—	565	365
Venereal disease produces—	578	368
Insensibility for 24 hours. (Ill. Case XXXV)	...	117
Instances of peculiarities of native evidence	17	16
Insurance. Abstinence in—	496	335
Accidental cases of death in—	497	336
Adverse influences in life—	479	327
Details of examination of applicant for—	457	319
Family history of applicant for—	463	321
Health of applicant for—	454	317
Heart disease in—	484	329
Intemperance in—	494	334
(Life). Chapter I on—	...	315
Companies	448	316
considered with Willich's formula	451	316
defined	...	315
how based	450	316
Medical examination of—	455	318
Murder for—	499	337
Nervous system of applicant for—	458	319
Occupation of applicant for—	461	320
Other conditions of applicants for—	462	320
Policy of—	446	315
Pulmonary diseases of applicant for—	459	319
Remarks on life	456	318
Rheumatism in—	485	329
Suicide in—	498	336
Urinary diseases of applicant for—	460	319
Various forms of—	447	316
Intelligence, prisoners	592	375
Intemperance in insurance	494	334
Intention. Presumption of—from weapon and violence used	69	47
Intercourse with a child. (Ill. Case LXXVI)	...	263
Internal appearances in death by hanging	292	205
organs. Chapter IX on Rupture of—	...	122
warmth preserved after rigidity	113	87
Intestine. Rupture of—	207-8	138-9
Intestines. Ulcerations of stomach and—	119	91
Intoxicant. Cannabis used as an—	745	467

	PARA.	PAGE.
Intoxication. Difference between brain concussion and—	. 134	106
Intussusception of bowels	. 627	406
Investigation. Method of—in supposed suicide . .	. 321	232
Iron as poison rarely used	. 678	432
Irritant poison	626,627	403,404
Difference between corrosive and— . .	. 626	403
poisoning. Diseases whose symptoms represent— .	. 627	404
Irritants. Chapter II on Poisonous—and Arsenic .	. ...	402
(mechanical)	. 789	496
specified	. 790	497
non-alkaloidal	. 619	392

L.

	PARA.	PAGE.
Labour (premature). Artificial inducement of . .	. 425	305
(precipitate). Cerebral hyperæmia with—(Ill. Case LXXXII)	. ...	282
Lamson's (Dr.) case. (Ill. Case LXXXIV) . .	. ...	474
Lancet on increase of suicide	. 262	179
Lathi. Bamboo or—common in Bengal . . .	. 70	48
Law on commitment of insanes to lunatic asylums .	. 601	379
Difference between—in England and India . .	73,86	56,60
English—presumes nothing	. 34	28
(Indian) requires amendment	. 593	375
Mahomedan—regarding evidence by proxy . .	. 18	17
Lead, as poison rarely used	. 678	432
poisoning	. 570	366
Legal (chemico-). Chapter on—Examinations . .	. ...	500
points	. 489	331
Legitimacy, abortion, and pregnancy. Chapter III on—	. ...	284
Grounds on which child's—may be disputed .	. 395	288
Medico-legal questions when—disputed . .	. 396	288
Presumption as to—	. 394	288
Questions in cases of contested—in divorce suits .	. 397	290
Lepers. Burying alive of—	. 314	227
Life. Addition to—	. 478	327
Expectation of—reduced in India . . .	. 481	328
Insurance. Adverse influences in— . . .	. 479	327
Chapter I on—	. ...	315
Companies	. 448	316
considered with Willich's formula . .	. 451	316
defined	. ...	315
Details of examination for— . . .	. 457	319

	PARA.	PAGE.
Life. Insurance how based	450	316
Remarks on—	456	318
risk. Albumen as affecting—	465	322
table defined	452	317
Table of average expectation of—	480	327
tables. English—	453	317
Uncertainty of human—	449	316
Ligature. Mark of—on the neck	277	195
Lightningstroke. Chapter V on—.	...	234
Deaths from—	312-326	227-236
Linen. Examination of—for blood	335	247
Live-birth. Summary of facts regarding—	382	276
Liver. Amount of arsenic found in—	646	414
Analysis of cases of rupture of—	209-11	139-40
of causes of rupture of—	196	135
Blood in abdominal cavity in cases of—	202	136
Cause of death in cases of rupture of—	193	134
Causes assigned for accidental ruptures of—	188	133
Complicated rupture of—spleen, and kidney	213	140
Condition of—in cases of rupture	189	313
Deaths from rupture of—	...	123
Diseased—as complication—	199	135
Enlargement of—	487	330
Fractured bones as complication in—	198	135
Hæmorrhage as complication in—	201	136
Nature of ruptures of—	190	133
Period of survival after rupture of	195	135
Position of rupture of—	191	134
Prognosis of ruptures of—	184	132
Quantity of blood extravasated in cases of—	203	136
Region where blood was effused from—	194	134
Rupture of—	181	131
causes of—	182	131
most common in Calcutta	185	132
Ruptures as complication in—	200	136
Ruptures of—only	186	133
Size of rupture of—	192	134
Statistics of rupture of—	187	133
Symptoms of rupture of—	183	132
Time between injury of—and death	204	136
Lizards	764	482
Locomotion. Fractures as affecting—	224	146
Lucid interval	505	339
Lunatic asylums. Law on commitment of insanes to—	601	379

	PARA.	PAGE.
Lunatics. Restraint of—	600	379
Lung diseases. Phthisis and—	473	325
test in case of strangulation of infant	374	272
Wounds of	147	114
Lungs. Death beginning at—	29 III	24

M.

Mackenzie's statistics of hanging	275	194
Madras Administration Report. Extracts from—	623	396
Statistics of accidental deaths in	(Table)	183
of arsenic poisoning in—	661	423
of poisoning in—	...	399
Times. Mr. Gribble's article in—	259-261	175-179
Maggots. Period of appearance of—	126,127	98
Magistrates and police officers. Rules for—	...	500
Mahabir (case of) charged with murder	282	200
Mahomedan law regarding evidence by proxy	18	17
Mania	533	354
Commencement of—	534	354
distinguished	537	355
Features of—	535	354
Puerperal—	560	363
Symptoms common in—	536	355
Marks of ligature on the neck	277	195
found on dead bodies	4	5
of blood	100	74
of violence no proof of murder	373	271
Marriage of Native girls	347	252
Marshall Hall's method of artificial respiration	272	185
Material concealment	490	331
Maternity of child. Case of midwife claiming—	421	303
Mechanical irritants	789	496
irritants specified	790	496
means used to destroy hymen. (Ill. Case LXXVII)	...	263
poison. Chopped hair as a—	791	499
Diamond dust as a—	791	498
Pounded glass as a—	791	497
Medical. Failure to call—aid	80	58
evidence	387	280
examination	491	332
examination in case of rape	355	256
of insuree	455	318
jurisprudence. Knowledge of—	2	2

	PARA.	PAGE.
Medical officer's duty in cases of poisoning	611	388
Rules for—	...	503
reports. What they should contain	5	5
responsibility (Ill. Case XVII)	...	67
Medicinal uses of mercury	671	430
Medicines (patent) containing mercury	672	430
Melancholia	541	356
bodily health in—	543	357
religious	544	357
Symptoms of—	542	357
Melanosis mistaken	118	91
Meningitis	539	356
Menstrual blood	104	78
period. Death during—	393	288
Mental disorders. Classification of—	530	351
unsoundness	514	345
weakness	572	367
Mercury	667	426
Medicinal uses of—	671	430
Patent medicines containing—	672	430
Mercurial poisoning. Antidotes for—	670	429
Statistics of—	673	430
Symptoms of acute—	668	427
of chronic—	669	428
Metallic poisons. Chapter on Antimony and other—	...	424
Methods of artificial respiration	269	184
(Howard's)	270	184
(Marshall Hall's)	272	185
(Sylvester's)	271	185
of restoring animal heat	268	184
Microscopic test of urine	468	323
Midwife. Case of—claiming maternity—	421	303
opinion in case of rape. (Ill. Case LXXV)	...	262
Mind. Deaf and dumb treated as persons of unsound—	591	374
(unsound) and insanity	582	369
unsoundness of—as regards accused	583	370
must be complete	586	371
when called upon to plead	590	374
Will valid if—unimpaired	598	378
Mineral acids. poisoning by—	117	91
Miscarriage. Attempt to cause—how dealt with	429	306
Causing—an offence in India	430	307
punishable in England	431	307
(criminal)	426	305

	PARA.	PAGE.
Miscarriage. Doubts as to—	408	298
(justifiable)	423	304
Means employed for obtaining—	407	297
Penal Code regarding—	427	306
regarding effect—has on child	428	306
with or without woman's consent	404	294
Modes of Death. Chapter on—	...	22
Tabular view of various—	29	23
Monomania	579	368
features of—	580	368
Moral imbecility	557	361
Morphine antidote to atropine. (Ill. Case XCVII)	...	479
Mortal wound. What is a—	72	55
Mortis, rigor	108	85
Mowah flower liquor. Effects of—(Ill. Case LXXXV)	...	475
Murder by suffocation	317	228
Case of—	293	206
Case of Mahabir charged with—	282	200
for insurance	499	337
Judicial—of innocent man	58	42
Marks of violence no proof of—	373	271
of suspected sorcerers. (Ill. Case XL)	...	119
or suicide.	94	70
(Ill. Cases XX to XXII)	...	80-82
Suicide intended to cause suspicion of—	98	72
Test of suicide or—(Ill. Case VII)	...	52
under influence of bhang	742	466
Weapon used affects definition of—	87	61
What constitutes—	74	56
Murderer. Body found in same house as—(Ill. Case XXXIV)	...	105
Blood-marks on clothes of—	105	78
Mutes (deaf) as witnesses	595	376
Mutilated remains. Special appearances in—	40 II	35
Mutilation as punishment	221	144
of bodies after death. (Ill. Case VI)	...	51

N.

	PARA.	PAGE.
Natives. Evidence of uneducated class of—	22	20
Peculiarities of—	17	16
Native girls. Age when—attain puberty	345	252
Marriage of—	347	252
Natural and criminal abortion	368	268
causes. Death of wounded persons from—	64	44
death. Suspicion in cases of—	47	38

	PARA.	PAGE.
Nature of wounds test of suicide or murder. (Ill. Case VII)	...	52
Navel-string. Accidental strangulation with—(Ill. Cases LXXX and LXXXI)	...	282
Neck. Injuries to spine and dislocation of—(Ill. Case XLI)	...	119
mark of ligature on the—	277	195
Neglect of slight wound. Death resulting from—	79	58
Nervous system of applicant for insurance	458	319
Nitric acid poisoning	684	435
Non-alkaloidal irritants	619	392
Non-identification of remains. (Ill. Cases I and II)	...	49
Notes. Police—	15	14
Nux vomica eaters	726	457
poisoning. (Ill. Cases LXXXVII and LXXXVIII)	...	475-76
statistics of death from—	720	454

O.

	PARA.	PAGE.
Object of this book. Scope and—	1	2
Observation. Necessity for careful—	3	4
Occupation of applicant for insurance	461	320
Officers. Rules for Magistrates and police—	...	500
rules for medical—	...	503
Operation. Death by surgical—(Ill. Case XVI)	...	67
death from surgical—	92	63
Opinion. Caution before expressing—	7	8
expression of—on facts	6	6
Opium	747	469
eating and smoking	750	470
fatal doses of—	752	471
medicinal use of—	748	469
ordinary dose of—	751	471
poisoning. Antidotes to	755	472
post-mortem appearances of—	756	472
statistics of—	749,53	469,71
symptoms of—	754	471
Ordinary skill, not eminent skill, expected. (Ill. Case XVIII.)	...	67
Organs. Chapter on Rupture of Internal—	...	122
deaths from rupture of internal—	...	123
most frequently ruptured	150	124
Order of frequency of rupture of internal—	...	123
Ornaments. Clothes or—may aid in establishing identity	41	36
Other conditions of applicants for insurance	462	320
Over-pressure a cause of suicide	265	181

	PARA.	PAGE.
P.		
Paralysis, general	558	362
Symptoms of general—	559	362
Patent medicines containing mercury	672	430
Peculiarities of native evidence	17	16
Penetration. (Ill. Case LXXIV *a*)	...	262
Perforation of stomach	627	405
Softening and—	120	92
Period in which body cools	107	85
of appearance of vesications	125	97
of death. Rules adopted in Europe regarding—	60	42
of discoloration	122	92
Peritonitis	627	405
injuries to abdomen causing— (Ill. Case XLIV)	...	151
Petroleum	689	436
Phthisical patents. Analysis of—	476	326
and lung diseases	473	325
statistics of—	475	325
pulmonalis	575	367
tendency in descendants	474	325
Physical suffering	319 (1)	229
Pistol-shot. Suicide by—	231	149
Poison. Aconite used as a—	746	468
action of—how modified	625	402
(arsenic). Trials for	651	418
(atropine). Treatment in—	735	462
(indestructible). Arsenic an—	650	417
irritant	627	404
(mechanical). Chopped hair as a—	791	499
diamond dust as a—	791	498
pounded glass as a—	791	497
(snake). Action of—	781,83	492,93
condy's Fluid renders—inert	786	496
transmission of	784	494
statistics of datura—	729	459
Poisoned with white arsenic. Case of Kimidi Maharani	630	407
Poisoning (aconite)	707	446
Difficulty of detecting—	708	447
statistics of—	710,715	448,451
symptoms of—	711	449
treatment and antidotes for—	713	450
(alcohol).	694	438
(ammonia)	685	435

	PARA.	PAGE.
Poisoning (ammonia) symptoms of— . . .	686	436
treatment and antidote in— . . .	687	436
(antimonial). Antidotes for— . . .	664	425
English cases—	666	426
symptoms of acute	662	424
of chronic—	663	425
(arsenic). Anomalous occurrences in— . .	642	412
deaths from—recorded as	648	417
errors regarding—	613	389
false charge of—	647	415
recoveries from—	645	414
similarity of—to cholera	644	413
symptoms of—	636	409
treatment in—	652	418
by arsenic attempts at—	629	406
in acute form	641	411
in chronic form	643	412
by atropine	734	462
by mineral acids	117	91
(camphor)	690	437
symptoms of—	691	437
treatment and antidotes for— . . .	693	438
(carbolic acid)	696	438
case of—	699	441
symptoms of—	697	440
Treatment and antidote in carbolic acid . .	700	441
(cattle)	657	420
statistics of—	658	421
(child)	655	419
(chloral)	695	438
(chloroform)	695	438
(copper). Symptoms of acute . . .	675	430
(criminal) by arsenic	635	409
curious case of—	743	466
(datura)	731	459
symptoms of—	733	460
diseases whose symptoms represent irritant— .	627	404
(ether)	695	438
evidence of—how obtained	615	390
general evidence of—	606	384
hydrochloric acid—	683	435
in Madras. Statistics of arsenic— . . .	661	423
inquries in cases of suspected	608	386
lead	570	366

	PARA.	PAGE.
Poisoning. Medical officers duty in cases of—	611	388
(mercurial). Antidotes for	670	429
statistics of—	673	430
symptoms of acute—	668	427
nitric acid	684	435
(opium). Antidotes of—	755	472
post-mortem appearances of	756	472
statistics of—	749,53	469,71
symptoms of—	754	471
possibility of case of—	614	389
(prussic acid)	701	441
case of—	702	442
post-mortem appearances in—	705	443
examination of decomposed	11	10
treatment and antidotes for—	704	443
(ptomaine)	774	487
signs of—in abortion	392	287
statistics of—	618	392
cases of arsenic—	628	406
—in Bengal	...	401
—in Bombay	...	400
—in Madras	...	399
(strychnine). Case of—	718	452
difficulty of detection of—	719	453
post-mortem appearances in death from—	724	457
symptoms of—	722	454
treatment in—	725	457
sulphuric acid—	...	433
Treatment in—	682	434
sulphuric acid—	681	434
(vegetable). Statistics of—	759	473
Poisonous snakes	775	489
classes of—	776	490
(colubrine)	777	490
fish	765	482
irritants and Arsenic. Chapter on—	...	402
Poisons. Accidental deaths due to unrestricted sale of	659	422
action of—may be modified	621	393
channels for getting rid of—	609	386
channels of access of—to the system	604	384
chapter on—	...	381
on animal—	...	481
on Antimony and other metallic—	...	424
on snake—	...	483

	PARA.	PAGE.
Poisons on vegetable—	...	445
definition of—	...	381
Dr. Van Steyzen's remarks on	622	395
effects produced by—	607	385
general character of symptoms of—	603	382
irritant—	626	403
irritant—corrosive and—difference between	626	403
local action of—	605	384
most generally used	624	398
other vegetable—	757	472
points to be noted in cases of alleged—	610	387
rarely used, are lead, zinc, and iron	678	432
remarks regarding—	758	473
(septic)	772	486
three classes of—	...	402
untractable—	620	392
Police. Confessions made to inadmissible as evidence	141	111
confessions obtained by—	140	111
notes	15	14
officers and Magistrates. Rules for—	...	500
Ordinary occurrence in evidence of—	142	112
zeal of—	21	21
Policy of insurance	446	315
Post-mortem after death from rape	356	256
appearances in body of drowned	250	170
in death from suffocation	305	219
conditions Statistics of— in death by suicide	299	210
delivery of fœtus	410	298
difference between vital and—ecchymosis	115	89
examination	49	39
of decomposed body	11	10
Potash (caustic)	688	436
Potassium	688	436
Pounded glass as a mechanical poison	791	497
Precipitate labour with cerebral hyperæmia— (Ill. Case LXXXII)	...	282
Pregnancy. Chapter on abortion, legitinacy, and—	...	284
determination of existence of—	403	292
evidence regarding—	364	267
usually produced to prove—	365	267
not necessary in England to establish crime	417	302
Preliminary remarks	1	1
Premature confinement by operation	416	301
expulsion of contents of uterus	424	305
labour, artificial inducement of—	425	305

	PARA.	PAGE.
Premeditation in case of gun-shot wound	230	149
Presumption as to legitimacy	394	288
in case of gun-shot wounds	232	149
of death	31	26
of intention from weapon used	69	47
of survivorship	32	27
Primary dementia	547	358
Prisoner's intelligence	592	375
Professional aborters	412	300
Prognosis of insanity	526	350
Progressive dementia	566	365
Proof of death by drowning. Summary of—	247	168
of rape. Defloration not sufficient—	333	246
Prostitution. Offering girls for—(Ill. Case LXXIX)	...	263
Proxy. Mahomedan law regarding evidence by—	18	17
Prussic acid. Fatal dose of—	703	443
poisoning	701	441
case of—	702	442
post-mortem appearances in—	705	443
treatment and antidotes for—	704	443
Ptomaine poisoning	774	487
Puberty. Age when European girls attain puberty in India	346	252
native girls attain puberty	345	252
Pubescence. Insanity of—	561	363
Puerperal mania	560	363
Pulmonalis, phthisis	575	367
Pulmonary diseases of applicant for life insurance	459	319
Punishment. Mutilation as—	221	144
Putrefaction causes changes in color of skin	121	92
changes produced by—	116	90
circumstances which promote and retard—	124	93
hypostasis occurs before—	115	88
opinion as to time of death from state of—	129	99
rate of—	128	98
Putrefy. Fat bodies—sooner than thin bodies	123	92

Q.

Quickening. Period of—	405	294

R.

Rape	329	238
alleged rape at age 47. (Ill. Case LXXI)	...	258
Case of—at age 47	332	246
Chapter on	...	238

	PARA.	PAGE.
Rape. Comparative signs of in adult and child	341	250
Curious instance of—(Ill. Case LXXVIII)	...	263
Death from hæmorrhage after—	344	251
Defloration not sufficient proof of—	333	246
Difference in law regarding—	348	253
Examination in—	330	238
False charges of—	340	249
(Ill. Case LXXII)	...	260
Injuries caused by—on virgin	342	251
Man cannot be convicted of—on wife	352	255
Medical examination in case of—	355	256
Midwives' opinion in case of—(Ill. Case LXXV)	...	262
on young girls. Caution necessary regarding charges of	334	247
Post-mortem after death from—	356	256
Presumption in favour of woman in—	351	254
Signs of—in dead	343	251
Special point for examination in case of—	357	257
Traces left of means employed to commit—	358	257
of injury on adults	331	246
What constitutes—	354	255
Woman's previous conduct in charge of—	349	253
statement in charge of—	350	254
Recovery from cut-throat. (Ill. Case XLI to LIII)	...	153-155
incised wound in abdomen. (Ill. Case XLV)	...	151
Religion. Effects of—on suicide	266	182
Religious feeling. Suicide from—	319 (4)	231
melancholia	544	357
Remains. Non-identification of— (Ill. Cases I & II)	...	49
Special appearances to be noted in case of mutilated—	40 II	35
Remarkable cases of identification	42	37
Remarks. Concluding—	25	22
on evidence of uneducated class of natives	22	20
Preliminary—	1	1
Reports. Medical—, what they should contain	5	5
Respiration. Changes before and after—	376	273
Howard's method of artificial—	270	184
Marshall Hall's method of artificial—	272	185
Methods of artificial—	269	184
Stylvester's method of artificial—	271	185
Responsibility. Anomaly as regards—	420	303
for death. Chapter on—	...	55
of aggressor for consequences of injury	76	56
Restraint of lunatics	600	379

	PARA.	PAGE.
Retracted vessels safest sign of wounds caused during lifetime	48	39
Revenge	319 (3)	230
Rheumatism. Gout or—	569	366
in insurance	485	329
Rice-pounder a common weapon of assault	68	46
Rigidity. Cadaveric—	109	86
Commencement of—	111	86
Duration of—	110	86
Internal warmth preserved after—	113	87
Rigor mortis	108	85
Rules for Magistrates and Police Officers	...	500
Definite—exist regarding survivorship	33	27
for Medical Officers	...	503
Rupture. Chapter on Wounds—and Other Injuries	...	106
diseased liver as complication	199	135
fractured bones as complication	198	135
in liver as complication	200	136
of bowel	205	136
caused by severe contusion	206	136
of heart	215	141
Fatality in—	217	142
of internal organs. Chapter IX on—	...	122
Deaths from—	...	123
result of violent injuries	146	113
of intestine	207,208	138,139
Analysis of cases of—	209-11	139-40
of liver	181	131
Causes of—	182	131
of accidental—	188	133
analysis of—	196	135
of death in—	193	134
Condition of liver in—	189	133
external marks of violence	197	135
most common in Calcutta	185	132
nature of—	190	133
only	186	133
Period of survival after—	195	135
Position of—	191	134
Prognosis of—	184	132
region where blood was effused	194	134
Size of—	192	134
spleen, and kidney. Complicated—	213	140
Statistics of—	187	133

	PARA.	PAGE.
Rupture of liver. Symptoms of—	183	132
of spleen	152	124
Case of—recorded by Chevers	219	143
Causes of—	170	129
of death in—	166	128
particulars	160	126
Condition of—	167	128
Death resulting from	178	131
External marks of violence in	163	127
Homicidal—	161	127
Nature of—	175	130
Percentage of—	179	131
Period of survival in —	220	143
after—	177	130
Position and size of—	165	128
Prognosis of—	154	125
Race and sex of cases of—	162	127
Remarks on—	157	126
Statistics of complicated—	158,168	126,128
Treatment of—	155	125
in case of internal hæmorrhage	156	125
Weight of spleen in—	168	128
of umbilical cord	380	274
Order of frequency of—	...	123
Situations of—	176	130
Ruptured. Organs most frequently—	150	124

S.

Sand. Smothering by—	310	222
Scars. Evidence in regard to—	8	8
Scope and object of this book	1	2
Scorpions	761	481
Sea-snakes	769	485
Secondary causes of death	83	59
of injury when death occurred. (Ill. Case XII)	...	66
Self-defence. Causing death in—	71	4
Self-inflicted wounds. (Ill. Cases XXIII to XXV)	...	82,838
Semen. Emission of—and fæces	284	201
Senile insanity	563	364
Septic poisons	772	486
Sexual intercourse. Insanity from—	528	351
Shame. Grief,—, and anger	319 (2)	229

	PARA.	PAGE.
Shell-fish	766	483
Shock. Death from—	62	43
Shrub (aconite)	709	448
Signs of wound of heart	218	142
Situations of wound	95	70
(Ill. Case XIX)	...	80
Skeleton or individual bones	40 III	35
Skin. Putrefaction causes change in color of—	121	92
Skull. Fractures of—	135	107
of newly-born infants	381	275
(Ill. Case XXXIX)	...	118
Smothering. Abnormal causes of—	311	222
by sand	310	222
Various kinds of—	303	218
Snake-bite. Cure for—	788	496
Only method of treatment of—	787	496
Treatment of—	785	495
poison. Action of—	781	492
Chapter on—	...	488
Condy's Fluid renders—inert	786	496
Transmission of—	784	494
Indian	780	492
poisonous	775	489
Classes of—	776	490
colubrine—	777	490
(sea)	769	485
viperine	778	490
terrestrial	779	490
Soda	688	436
Sodomites affect society of their own sex	434	309
Appearance of anus of—	438	310
free from hereditary taint	435	309
Genital organs of—	437	310
Marks of violence on—unusual.	439	310
Medical appearances of—	436	309
Peculiarities of—	433	309
Post-mortem examination of—	440	310
Sodomy and Bestiality. Chapter on Unnatural Offences—	...	308
Examination in cases of—	441	311
Statements of medical witnesses regarding	441	311
What constitutes—	432	308
Softening and perforation of stomach	120	92
Sorcerers. Murder of suspected—(Ill. Case XL).	...	119

	PARA.	PAGE.
Spasm. Cadaveric—(Ill. Case XXVII)	...	83
Special appearances of mutilated remains—	40 II	35
Specific gravity of urine	467	322
Spectroscopic appearances of blood.	103	78
Spermatozoa (human) and animal hairs	443	313
Blood-stains and—	337	248
Spiders and centipedes	762	481
Spine. Injuries to—	137	109
and dislocation of neck. (Ill. Case XLI)	...	119
Spleen. Case of rupture of—recorded by Chevers	219	143
Cause of death in cases of rupture of—	166	128
resulting from rupture of—	178	131
rupture of—	159,170	126,129
Condition of—in cases of rupture	167	128
in noted cases	173	129
Complicated rupture of liver,—and kidney	213	140
Enlargement of—	488	330
External marks in rupture of—	163	127
Homicidal rupture of—	161	127
most frequently ruptured	151	124
Nature of injuries caused to—	180	131
ruptures of—	175	130
Particulars of rupture of—	160	126
Percentage of complicated ruptures of—	179	131
Period of survival in case of rupture of—	177,220	130,143
Position and size of rupture of—	165	128
Prognosis of rupture of—	154	125
Race and sex of cases of rupture of—	162	127
Remarks on rupture of—	157	126
Rupture of—	152	124
Size of—	164,174	127,129
Symptoms of rupture of—	153	124
Treatment of rupture of—	155	125
in case of internal hæmorrage	156	125
Weight of—in cases of rupture	168	128
Squeezing of testicles. Death from—	63	44
Starvation. Chapter on Sun-stroke, Lightning-stroke—	...	234
Chronic—	327	237
Symptoms and signs of—	328	237
Statements regarding age unreliable	353	255
Statistics of accidental deaths in Madras	(Table)	183
of aconite poisoning	710,715	448,451
of arsenic poisoning in Madras.	661	423

	PARA.	PAGE.
Statistics of atropine and datura poisoning . . .	737	463
of cases of arsenic poisoning	628	406
of cattle-poisoning	658	421
of complicated rupture of spleen	169	128
of datura poison in India	729	459
of death from atropine	730	459
of deaths from nux vomica and strychnine poisoning	720	454
from violence	...	157
of hanging (Mackenzie's)	275	194
of incomplete hanging	288	202
of mercurial poisoning	673	430
of opium poisoning	749,53	469,71
of phthisical patients	475	325
of poisoning	618	392
of poisoning in Bengal	...	401
of poisoning in Bombay	...	400
of poisoning in Madras	...	399
of *post-mortem* in death by suicide	299	210
of suicides	318	229
of suicides and accidental deaths	258	175
of uncomplicated rupture of spleen	158	126
Stimulants	654	419
Stomach. Perforation of—	627	405
Softening and perforation of—	120	92
Ulceration of—and intestines	119	91
Strangling	285	201
Strangulation and Hanging. Chapter on— . . .	...	193
(accidental) with navel-string (Ill. Cases LXXX and LXXXI)	...	282
Death by—	294	206
without injuries	286	202
Different modes of—	295	207
Inspection of bodies in hanging or—	302	212
Lung test in case of—of infant	374	272
(suicidal) with hair	308	220
Stricture of the urethra	486	330
Strychnine	716	451
Characteristics of—	717	452
poisoning. Case of—	718	452
Difficulty of detection of—	719	453
(Ill. Case LXXXVII, LXXXVIII, XC and XCI)	...	475-77
Post-mortem appearance in death from— .	724	457
Symptoms of—	722	454

	PARA.	PAGE.
Strychnine poisoning. Treatment in—	725	457
Quantity of—likely to prove fatal	721	454
Statistics of deaths from nux vomica and—	720	454
Table of diagnosis of death from—	723	456
Strychnos tetanus or disease tetanus	727	458
Submersion. Death before—	248	169
Subsequent evidence regarding wounds	43	37
Sudden death. Causes of—	30	25
Suffering. Physical—	319 (1)	229
Suffocation. Accidental— (See Ill. Case LX)	...	223
and asphyxia. Chapter III on—	...	218
by a live fish. (See Ill. Case LXX)	...	225
Case of murder by—	293	206
Definition of—	...	218
from inhalation of noxious gases	...	226
Homicide by—	306	220
Homicidal. (See Ill. Case LXI to LXV)	...	223
Method of—	307	220
Murder by—	317	228
Patient dies of—in case of cut-throat	84	59
Post-mortem appearances in death from—	305	219
resulting from diseased states	309	221
Suicidal—	304	219
(See Ill. Cases LXVI and LXVII)	...	224
Sudden death. Cases of—in lunatic asylums	145	113
Suicidal cases	649	417
suffocation	304	219
(See Ill. Cases LXVI and LXVII)	...	224
strangulation with hair	308	220
Suicide. By pistol-shot	231	149
by suttee	320	232
Cases of—	263	180
Causes of—	255,319	174,229
detail in cases of alleged—	283	201
Effects of destitution on—	264	180
of religion on—	266	182
from religious feeling	319 (4)	231
Hanging usually due to—	278	196
in insurance	498	336
intended to cause suspicion of murder	98	72
Lancet on increase of—	262	179
Method of investigation in supposed—	321	232
Murder or—	94	70

	PARA.	PAGE.
Suicide. Nature of wounds a test of—or murder. (Ill. Case VII)	...	52
or Murder. (Ill. Cases XX to XXII)	...	80, 82
Over-pressure as a cause of—	265	181
Remarks on—	301	211
Suriyana Kovil case of alleged	280	197
Suicides. Accidental deaths and—	251	172
Causes of—in India	236	158
Cord used by—	300	211
Statistics of—	318	229
and accidental deaths	258	175
post-mortem in death by	299	210
Sulphuric acid poisoning	...	433
Quantity required for fatal dose	680	433
Symptoms of—poisoning	681	434
Treatment in—poisoning	682	434
Summary of facts regarding live-birth	382	276
of proofs of death by drowning	247	168
Sunstroke	325	235
Chapter V on—	...	234
Insanity from—	573	367
Supposititious children	422	304
Surgical operation. Death from—	92	63
Death by— (Ill. Case XVI)	...	67
Suriyana Kovil case of alleged suicide	280	197
Survival, period of—in case of rupture of spleen	220	143
Survivalship. Definite rules exist regarding—	33	27
Exceptional rules regarding—	35	28
Presumption of—	32	27
Suspicion of murder. Suicide intended to cause—	98	72
Suspended animation	372	271
Suttee. Suicide by—	320	232
Sylvester's method of artificial respiration	271	185
Symptoms and signs of chronic starvation.	328	237
of insanity	509-10	341-43
of rupture of spleen	153	124
Syncope	26	22
Death beginning at the heart	29	23
Swallowing a coin. (Ill. Case LXVIII)	...	224
a fish. (Ill. Case LXIX)	...	225

T.

Table of average expectation of life	480	327
Tabular view of modes of death	29	23

	PARA.	PAGE.
Taylor's summary of infanticide	385	279
regarding injuries to infants	384	278
Temporary capacity of insane	596	377
Terrestrial snakes	779	490
Testicles. Death from squeezing of—	63	44
Test. Nature of wounds a—of suicide or murder (Ill. Case VII)	...	52
of capacity of insane to make a will	597	377
Testing the urine	464	321
Tetanic spasm. (Ill. Case LXXXIX)	...	476
Tetanus	88	61
caused by wound	89	62
(strychnos or disease)	727	485
Throat. Marks on the—in death by epilepsy	297	208
Throttling	296	208
Time of death. Opinion as to—from state of putrefaction	129	99
Times. Mr. Gribble's article in *Madras*—	259-261	175-179
Torture (Ill. Case XLII)	...	119
by *Bansdola*	139	110
Traces of injury on adults in rape	331	246
Transmission of snake-poison	784	494
Treatment. Cases of unskilful—	78	57
of the drowned	267	183
Death arising from unskilful—of wounds	77	56
of snake-bite	785	495
Only method of—	787	496
Tremens. Delirium—	91,538	62,355
True case. False evidence in—	19	17
Tuberculosis in insanes	529	351

U.

	PARA.	PAGE.
Ulcerations of stomach and intestines	119	91
Umbilical cord. Rupture of—	380	274
Unauthorised assault. Effects of—	81	58
Uneducated class of natives. Evidence of—	22	20
Unnatural offence by husband on wife. (Ill. Case LXXIV)	...	261
Offences. Chapter V on—Sodomy and Bestiality	...	308
Unskilful treatment. Cases quoted of—	78	57
Death arising from—of wound	77	56
Unsound mind and insanity	582	369
Deaf and dumb treated as persons of—	591	374
Unsoundness, mental	514	345
of mind as regards accused	583	370

	PARA.	PAGE.
Unsoundness, must be complete	586	371
when called upon to plead	590	374
Untractable poisons	620	392
Urethra. Stricture of the—	486	330
Urinary diseases of applicant for life insurance	460	319
Urine. Microscopic test of—	468	323
Specific gravity of—	467	322
Testing the—	464	321
Uterine existence divided into two parts	363	267
Uterus. Premature expulsion of contents of—	424	305

V.

	PARA.	PAGE.
Van Steyzen's (Dr.) remarks on poisons	622	395
Vegetable poisons. Chapter on—	...	445
(other)	757	472
Statistics of—	759	473
Venereal disease. Marks of apparent—misleading	339	249
produces insanity.	578	368
Vesicles. Period of appearance of—	125	97
Vessels. Clean—a necessity	612	388
Retracted—safest sign of wounds caused during lifetime	48	39
Violence. Death of wounded from natural causes mistaken for—	64	44
External marks of—	172	129
Marks of—no proof of murder	373	271
Presumption of intention from weapon and—used	69	47
Statistics of death from—	...	157
Viperine snakes	778	490
Virgin. Injuries caused by rape on—	342	251
Vital. Difference between—and *post-mortem* ecchymosis	115	89
Volatile acids	689	436

W.

	PARA.	PAGE.
Warmth. Internal—preserved after rigidity	113	87
of body important evidence	290	203
Wasps, hornets, and bees	763	482
Water. Buoyancy of decomposed body in—	131	100
Decomposition in air, earth, and—	130	99
Weapon. By what kind of—was wound caused	66	45
Presumption of intention from—and violence used	69	47
Rice-pounder a common—of assault	68	46
used affects definition of murder	87	61

	PARA.	PAGE.
Weight of spleen in cases of rupture—	168	128
White arsenic	640	411
and arsenicum	633	408
Case of Kimidi Maharani poisoned with—	630	407
Widow. Burying alive of—with deceased husband	316	228
Will valid if mind unimpaired	598	378
Willich's formula. Life insurance considered with—	451	316
Witch-swinging	315	228
Witness. Deaf mutes as—	595	376
Insanity as affecting—	594	375
Worms	576	367
Wound and rupture of heart. Fatality in cases of—	217	142
appearance of—inflicted after death	57	42
inflicted during life	56	41
Blank charge often causes—like gun-shot—	233	150
Bruises or contused—	52	40
By what kind of weapon was—caused	66	45
Cases in which death results from neglect of slight—	79	58
caused after death	45	38
before or after death	10,51	9,40
Distinguishing features of—	46	38
Evidence whether—	44	38
Chapter on—and injuries	...	29
Chapter VIII on—Ruptures and Other Injuries	...	106
Death arising from unskilful treatment of—	77	56
Difficulties in regard to fractures greater than in case of—	67	46
Direction of—	97	72
Examination of external—	9	9
Gun-shot—	225	146
from conical or round bullet	227	147
of entrance	226	147
Premeditation in case of—	230	149
Presumption in case of—	232	149
Incised—to chest	138	109
Nature and extent of—	96	71
test of suicide or murder. (Ill. Case VII)	...	52
of face	136	108
of head	133	106
of heart	148,216	115,141
of lungs	147	114
or hurt hastening death in person already diseased	82	58
Position and course of—to be described	59	42
Retracted vessels safest sign of— caused during lifetime	48	39

	PARA.	PAGE.
Wound. Self-inflicted—(Ill. Cases XXIII to XXV) .	...	82, 83
Situation of—	95	70
(Ill. Case XIX)	...	80
Size and description of—to be noted	50	39
Subsequent evidence regarding—	43	37
to bladder and gall bladder generally prove fatal .	214	141
What are—	36	30
What is a mortal—	72	55
Whether tetanus caused by—	89	62
Wounded persons. Death of—from natural causes mistaken for violence	64	44

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